HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE (HTRW) ENVIRONMENTAL SITE ASSESSMENT HEGEWISCH MARSH CHICAGO, ILLINOIS

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INTRODUCTION

The purpose of this report is to discuss the hazardous, toxic, and radioactive waste (HTRW) investigation for the Hegewisch Marsh Section 506 Great Lakes Fishery and Ecosystem Restoration Project. This report identifies both HTRW and non-HTRW environmental issues, and presents appropriate measures to resolve these issues. The methods used in performing the investigation are described in detail. Conclusions and recommendations regarding potential impacts due to HTRW and non-HTRW environmental issues associated with the project site are provided.

AUTHORITY

Engineer Regulation (ER) 1165-2-132, Hazardous, Toxic, and Radioactive Waste (HTRW) Guidance for Civil Works projects, requires that a site investigation be conducted as early as possibly to identify and evaluate potential HTRW problems. According to ER 1165-2-132, non-HTRW issues that do not comply with the federal, state, and local regulations should be discussed in the HTRW investigation along with HTRW issues.

The HTRW investigation presented in this report was conducted during the feasibility phase of the project. This report was performed at the level of detail required and relies on existing information, observations made through database research, an aerial photograph, topographic map, and historical document review, a site visit, and information provided by the local sponsor. As stated in the ER-1165-2-132 an initial assessment as appropriate for Reconnaissance Study should be conducted as a first priority for projects with no prior HTRW consideration. If the initial assessment indicated the potential for HTRW, testing, as warranted, and analysis similar to a Feasibility Study should be conducted prior to proceeding with the project design.

Hazardous, Toxic, and Radioactive Waste

The objective of ER 1165-2-132 is to outline procedures to facilitate early identification and appropriate consideration of HTRW. This investigation, therefore, identifies potential HTRW and discusses resolutions and/or provides recommendations regarding the HTRW identified.

Non-Hazardous, Toxic, and Radioactive Waste

According to ER 1165-2-132, non-HTRW environmental issues that do not comply with federal, state, and local regulations should be discussed in the HTRW investigation along with HTRW. For example, solid waste is a non-HTRW issue considered. Petroleum releases from Leaking Underground Storage Tanks (LUSTs) are not considered HTRW, but are regulated under Illinois Administrative Code (IAC), Title 35, Part 731 – Underground Storage Tanks, Part 732 – Petroleum Underground Storage Tanks, and Part 742 – Tiered Approach to Corrective Action Objectives (TACO). These sites have the

potential to impose environmental hazards. Non-HTRW issues identified during the investigation are also discussed in this report, along with resolutions and/or recommendations for resolution.

GUIDANCE

Supplemental guidance was provided by the Standard Practice for Environmental Assessments: Phase I Environmental Site Assessment Process (Designation: E 1527-13) prepared by the American Society for Testing of Materials (ASTM). The purpose of this guidance is to define good commercial and customary practice in the United States of America for conducting an environmental site assessment of a parcel of commercial real estate with respect to the range of contaminants within the scope of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) (42 U.S.C. §9601) and petroleum products. These standards recommend that an environmental assessment include a records review, site visit, interviews, and report preparation.

The goal of the environmental site assessment process is to identify recognized environmental conditions (RECs) on a property. The term recognized environmental conditions means the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment. De minimis conditions are not recognized environmental conditions; background concentrations of anthropogenic compounds are de minimis.

LAWS AND REGULATIONS

Federal

The definition of HTRW according to ER 1165-2-132, page 1, paragraph 4(a) is as follows: "Except for dredged material and sediments beneath navigable waters proposed for dredging, for purposes of this guidance, HTRW includes any material listed as 'hazardous substance' under the Comprehensives Environmental Response, Compensation and Liability Act, 42 U.S.C. 9601 et seq (CERCLA). (See 42 U.S.C. 9601(14).) Hazardous substances regulated under CERCLA include 'hazardous wastes' under Sec. 3001 of the Resource Conservation and Recovery Act, 42 U.S.C. 6921 et seq; 'hazardous substances' identified under Section 311 of the Clean Air Act, 33 U.S.C. 1321, 'toxic pollutants' designated under Section 307 of the Clean Water Act, 33 U.S.C. 1317, 'hazardous air pollutants' designated under Section 112 of the Clean Air Act 42 U.S.C. 7412; and 'imminently hazardous chemical substances or mixtures' on which EPA has taken action under Section 7 of the Toxic Substance Control Act, 15 U.S.C. 2606; these do not include petroleum or natural gas unless already included in the above categories. (See 42 U.S.C. 9601(14).)"

As noted in 42 U.S.C. 9601(14), the term "hazardous substance" does not include crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance, nor does the term include natural gas, natural gas liquids, liquefied natural gas, or synthetic gas usable for fuel. Underground storage tanks (USTs) are federally regulated under 40 CFR Part 280, which includes technical standards and corrective action requirements for owners and operators of USTs.

State

The Illinois State regulations were examined to determine which regulations governed the state specific hazardous waste disposal, release, and cleanup requirements. Illinois regulates USTs under Illinois Administrative Code, Title 35, Subtitle G, Chapter I, Subchapter D, Part 731, Underground Storage Tanks. The definition of a regulated substance under this regulation means any "hazardous substance" or "petroleum". Hazardous substance UST is defined as an UST system that contains a "hazardous substance" or any mixture of "hazardous substances" and "petroleum" which is not a petroleum UST system. Petroleum UST means any UST system that contains petroleum or a mixture of petroleum with minimal quantities of other regulated substances.

Owners and operators of petroleum or hazardous substance UST systems must comply with the requirements of Part 731 except for USTs excluded under Section 731.110(b) and UST systems subject to RCRA corrective action requirements under 35 Ill. Adm. Code 724.200, 724.296, 725.296, or 725 Subpart G. Other Illinois hazardous waste regulations included in 35 Illinois Administrative Code Subtitle G, Chapter I, Waste Disposal include Subchapter b, Permits; Subchapter c, Hazardous Waste Operating Requirements; Subchapter d, Part 738, Hazardous Waste Injection Restrictions; Subchapter e, Specific Hazardous Waste Management Standards; and Subchapter h, Illinois "Superfund" Program.

SITE DESCRIPTION

The Hegewisch Marsh Natural Area (approximately 130-acres), located in the City of Chicago, southern Cook County, Illinois (Figure 1) is bounded by the Calumet River to the west, the South Shore rail line to the north, Torrence Avenue to the east, and East 134th Street to the south (see Figure 2). For the purposes of this investigation, the USACE project area is broken into distinct areas to differentiate between the parcels based on previously conducted investigations. Figure 2 notes the individual areas discussed in this report. Ecosystem restoration activities conducted to date within the Hegewisch Marsh Natural Area include invasive species control (herbicide/cutting/burning), seeding, tree planting, establishment of path system and significant debris removal. Local entities removed debris from the site deposited through historic illegal dumping including 7 cars, 10 ton of tires, 160 ton of construction debris, and 18 ton of miscellaneous refuse.

The largest portion of the USACE project area is the Hegewisch Marsh parcel consisting of 100-acres of undeveloped property. The site contains a small open water area and walking trails throughout. A water level control structure was installed onsite in 2008 to manage the large wetland as a hemi-marsh. A portion of the Hegewisch Marsh parcel is designated as "potential wetland mitigation" area proposed for the 130th and Torrence Avenue project (Department of the Army Clean Water Act Section 404 permit 200201001). The northeast corner of the Hegewisch Marsh parcel is designated as the "truss storage area" currently being used for storage of construction materials for the road improvement project at 130th and Torrence (Department of the Army Section 404 Clean Water Act permit LRC-2002-11718). This area was removed from the USACE project area during the planning phase of the project and will be restored using USACE guidelines post-construction. The southeast corner of the Hegewisch Marsh natural area is referred as the "17-acre Norfolk/Southern southeast parcel" in previous investigations. This area was removed from the USACE project area during the planning phase of the project and will be restored by others. The southwest corner of the site is referred as the "10-acre Metropolitan Water Reclamation District (MWRD) parcel".

PROJECT DESCRIPTION

The proposed environmental restoration measures for the Hegewisch Marsh Project consists of the following measures: utilization of existing water control structure to set elevation of hemi-marsh to 584 NVGD, bank naturalization to lessen and smooth the Calumet River bank slopes and along two areas along the marsh, naturalize various wet areas of site into vernal pools, and establish a variety of plant communities at the site, including marsh, wet prairie and woodland using invasive species removal, selective seeding, plug planting, predatory control, and prescribed burns (see Figure 3). The implementation of all of these measures would restore pond, wetland and riparian communities within Hegewisch Marsh. More detail will be added to the plan in the PED/P&S Phase to further specify the spatial distribution of native plugs within a given zone and species clumping, planting centers, soil amendment percentages, temporary predator controls, and establishment activities.

GENERAL METHODS

The following sections contain information that was requested and gathered in accordance with ER 1165-2-132 for this assessment. The information was obtained from:

- Historical topographic maps and aerial photograph review
- Existing information review
- Database research
- Coordination with local sponsor

This information was used to determine if the measures selected for restoration will have an impact on any environmental conditions that may exist in the surrounding areas, and if there are environmental conditions on-site will have an impact on implementation of the project.

HISTORICAL TOPOGRAPHIC MAP AND AERIAL PHOTOGRAPH REVIEW

RECs can be determined by identifying the past land use and site activities at the project area and surrounding areas. Identifying industrial and residential areas, observing any evidence of topographic changes, and locating extensive areas that lack vegetation can determine indications of a potential REC. See Attachment 1 for historical maps and photographs. Over the past 200 years, Hegewisch Marsh has been significantly altered. Hegewisch Marsh was once part of an extensive system of marsh wetlands that extended across the southern lake plain. The marsh was located just south of Lake Calumet, and drained north through what was then the Little Calumet River into Lake Michigan near South Chicago. The Grand Calumet River was located south of Hegewisch Marsh, first flowing to the west, then looping around northwards near present day Blue Island. A 1795 map of the Northwest Territories indicates there was no apparent surface water connection between the two drainages. However by 1812, a map drawn by General William Hull of Illinois waterways indicated that a portage channel had been cut between the Little Calumet and Grand Calumet rivers, presumably by 'Indian traders'. This channel ran through Hegewisch Marsh and was gradually deepened and renamed the Calumet River; while that portion of the Grand Calumet downstream of the Calumet River was re-named the Little Calumet. In 1938, the portion of the Calumet River bisecting Hegewisch Marsh was filled in to redirect the channel south. At various times since, clay fill and rubble has been added to the marsh, initially from the former Calumet River channel to the south. While the topography of the project area has been significantly altered, there are no indications from historical aerials and topographic maps that the project area was used for commercial or industrial development.

EXISTING INFORMATION REVIEW

Geology and Glacial Stratigraphy

The Hegewisch Marsh site is part of the Equality Formation and is situated within the Carmi Member and sandwiched between two fingers of the Dolton Member. These two members often seamlessly grade vertically into each other. The Carmi Member is dominantly silt with clay and sand lenses. The Dolton Member consists primarily of sands and gravels. Much of the area surrounding Hegewisch Marsh was modified for industrial and residential purposes; therefore these two geologic features may have been impacted via excavation and mixing by these past activities.

Soil Type and Quality

The Hegewisch Marsh resides in an area that was unmapped for soils by the NRCS due to the industrialized nature of the south Chicago area. Review of historical information and previously prepared phase I reports for the project area suggest that natural soils have been altered at the site, with significant changes in topography from previous filling activity conducted in the marsh during construction of adjacent projects and historic illegal dumping. The environmental quality of site soil is discussed in other areas of this report.

Hydrology

On-site hydrologic studies discussed in Appendix B suggest that the Hegewisch Marsh Natural Area is underlain with a sand lens that is hydrologically contiguous with the Calumet River. Site groundwater is being lost through the sand lens to the southwest and into the river. For the purposes of this investigation, the primary gradient is assumed to be to the south and west, toward the Calumet River.

Previous Site Assessments

Several phase I and phase II environmental site assessments (ESAs) have been conducted in the USACE project area; results of each investigation are summarized in this section. Where soil, groundwater, and sediment results are included, results have been compared to human health risk values established in the State of Illinois Tiered Approach to Corrective Action Objective (TACO) values using the Tier 1 residential and class II migration to groundwater standards, or Tier 3 site-specific human health remedial objectives for lead and chromium. TACO is the Illinois EPA's method for developing remediation objectives for contaminated soil and groundwater. The remediation objectives protect human health and take into account site conditions and land use. Remediation objectives generated by TACO are risk-based (Tier 1 residential for unrestricted use) and site-specific (Tier 3 site-specific for lead and chromium). Class II groundwater standards are used within the City of Chicago where potable groundwater (Class I) use is restricted through ordinance. Water quality results are compared to the State of Illinois general use Water quality standards (WQS), the standards that apply to almost all waters of the state and are intended to protect aquatic life, wildlife, agricultural, primary contact, secondary contact, and most industrial uses. Soil, water, and sediment results are also compared to the Calumet Open Space Reserve (COSR) Ecotox Protocol, a framework establish by Federal, State, and Local agencies for investigating ecotoxicological risks and defining standards for rehabilitation that address ecological health within the Calumet area open spaces, where Hegewisch Marsh is located. The COSR Threshold (NOAEL) and Benchmark (LOAEL) and background values are included in the summary tables, where applicable. All TCLP metal data generated during remedial activities conducted on-site is compared to RCRA hazardous waste criteria. USACE did not conduct an independent data quality assessment on analytical data used to complete this report. Data is assumed to be of sufficient quality to conduct qualitative screening.

Two RECs have been identified in the project area:

- Previous ESAs suggest the Calumet River underwent significant changes in the project area after 1937 when it is was declared unnavigable, at which time it was straightened, widened and moved. Fill materials generated from the channel construction were placed in adjacent marsh areas. Meandering portions of the Calumet River that flowed in southern portions of Hegewisch Marsh were filled to direct the Calumet River south. Due to the industrial nature of the land use adjacent to the river at the time, any sediment dredged from the Calumet River or fill material subsequently deposited in the marsh were presumed contaminated.
- There is a history of fly dumping on the site.

Hegewisch Marsh - Metropolitan Water Reclamation District (MWRD) Phase I 1997

A phase I ESA was conducted in Hegewisch Marsh for the proposed MWRD Tunnel and Reservoir Plan Torrence Avenue Tunnel Project construction shaft, pumping stations, and storm water reservoir by Kowalenko & Bilotti for MWRD in 1997 (Kowalenko 1997). Results of the investigation suggested that the Calumet River had undergone significant changes in the project area after 1937 when it is was declared unnavigable, at which time it was straightened, widened and moved south. Fill materials generated from the channel work and construction of the O'Brien Lock and Dam were placed in adjacent marsh areas surrounding the river; portions of the Calumet River that flowed in southern portions of Hegewisch Marsh were filled. Between 1967 and 1976, approximately 2 million cubic yards of sediment dredged from the Calumet River and Harbor and placed in the Calumet region. The largest disposal area was located adjacent to the O'Brien Lock and south of 130th Street, likely within Hegewisch Marsh. Due to the industrial nature of the land use adjacent to the river at the time, any sediment dredged from the Calumet River was presumed contaminated. The ESA suggested phase II soil testing in the areas of proposed construction to better understand the cost of disposal of soils for the project. It is unclear if a phase II investigation was conducted; MWRD did not pursue the project further.

Hegewisch Marsh - Waste Management Phase I 2001

A phase I ESA was conducted in Hegewisch Marsh in April 2001 by Earth Tech for Waste Management, the previous site owner, to identify known or suspected environmental conditions associated with the site and adjacent properties which may have adversely affected the site (Earth Tech 2001). RECs identified in the 2001 ESA include: wetlands on-site, adjacent properties uses, automotive repair shop with complaints of illegal dumping of materials, USTs on adjacent properties, and fly dumping from accessible areas to the west, north, and east. Fly dumping items include numerous 55-gallon drums, acetylene tanks, household waste, automotive materials, and construction debris (including roofing tiles with potential asbestos containing materials).

Hegewisch Marsh – URS Phase II 2003

As a result of the Phase I ESA conducted on Hegewisch Marsh by Earth Tech in 2001, the City of Chicago obtained the services of URS to conduct soil sampling in Hegewisch Marsh in 2002 and 2003 (URS 2003). URS advanced 15 soil borings at Hegewisch Marsh in areas where RECs had been identified. Samples were analyzed for metals, volatile organic compounds (VOC), and semivolatile organic compounds (SVOC); a limited number of samples were also analyzed for polychlorinated biphenyls (PCB). Soil sampling results are included in Table 1; sample locations are shown on Figure 4. Results suggest that aluminum, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, selenium, silver and vanadium were reported above background concentrations of metals found in the Chicago area, but do not exceed the TACO residential risk value. In addition, the levels of several metals exceed the COSR threshold value, but only exceed the benchmark value for selenium and silver. Concentrations of lead and chromium found in soil sample SB-10 are relatively high when compared to results of other soil sample collected as part of the investigation.

Hegewisch Marsh Potential Wetland Mitigation – TTEMI Phase II 2003

A portion of the Hegewisch Marsh parcel was previously identified as a "potential wetland mitigation" area for the 130th and Torrence Avenue project in a Department of the Army Clean Water Act Section 404 permit (200201001). The proposed mitigation site included 4.25 acres of wet prairie creation within Hegewisch Marsh to off-set 1.7 acres of wetland impacts associated with the 130th and Torrence Avenue construction project. While the 130th and Torrence Avenue project did move forward, an alternate mitigation site was proposed. The mitigation project in Hegewisch Marsh was not complete. A phase II investigations was conducted on the property to determine the feasibility of conducting wetland mitigation at the site. The City of Chicago obtained the services of TTEMI to conduct sampling at the potential wetland mitigation site. TTEMI collected soil samples from ten locations in the wetland mitigation area in 2002 (TTEMI 2003). At four of the ten locations, soil samples were collected and analyzed for particle size, VOCs, SVOCs, PCBs, pesticides, metals, and pH. Analytical results for samples submitted for chemical characterization suggest that soils in the area contain metals above the COSR threshold levels, but do not exceed TACO tier 1 residential remediation objectives. Results are included in Table 2; sample locations are noted on Figure 5.

Hegewisch Marsh – TTEMI Phase II 2006

TTEMI was tasked by the City of Chicago Department of Environment to design the site plan for the rehabilitation of Hegewisch Marsh. TTEMI developed a conceptual site model for the ecological community at Hegewisch Marsh assuming that the contamination at the marsh was not from one source but was derived from a variety of activities, including fly dumping, dredge material disposal, and other activities. The model identified a number of potential receptors at the marsh including mammals, birds, fish, and invertebrates. As part of that rehabilitation activity, Tetra Tech conducted soil, sediment, and surface water sampling at the site (TTEMI 2006). The sampling conducted

supplements the limited existing data collected from the Phase II investigation (URS 2002). Sample locations area shown on Figure 6; results are summarized in Tables 3 through 6. Soil sampling results suggest that the concentrations of arsenic and mercury exceed background, TACO Tier 1 residential risk and COSR benchmark values in samples HM-S-04, HM-S-09, HM-S-10, HM-S-14, and HM-S-15. Concentrations of cadmium, copper, selenium, and zinc exceed background concentrations and COSR benchmark values in samples HM-S-03, HM-S-14, and HM-S-15. Concentrations of beryllium, chromium, lead, nickel silver, and thallium exceed background, TACO and/or COSR benchmark values in one or more samples, with elevated concentrations of metals found at HM-S-16 and HM-S-18. PAHs were detected in concentrations above background but below TACO and COSR values in some samples, and DDE, DDD, and DDT were detected in concentrations that exceed COSR benchmark values in samples HM-S-03, HM-S-04, HM-S-12, HM-S-15, and HM-S-17. No hazardous metals were detected. Sediment sampling conducted suggests the concentration of lead present in samples HM-SD-01, HM-SD-02, HM-SD-03 and HM-SD-04 exceed the COSR benchmark value but do not exceed TACO Tier 1 risk residential. Surface water sampling conducted suggests the concentrations of nickel and zinc in the surface water exceeds the State of Illinois chronic aquatic standard in samples HM-SW-01, HM-SW-02, HM-SW-03, and HM-SW-04, but do not exceed the COSR benchmark value.

17-acre Norfolk/Southern Southeast Parcel – CCA 2002 and TTEMI 2008

Two phase I ESAs were completed for the 17-acre Norfolk/Southern Parcel for the City of Chicago. The first was completed in December 2002 by Carnow, Conibear & Associates (CCA) (CCA 2002) and the second by TTEMI in 2008 (TTEMI 2008 N/S Phase I). The 2002 ESA identified the following RECs: a railroad spur (operated by Norfolk Southern Railroad) on the eastern side of the property, fly dumping, illegal soil disposal along Torrence Avenue, and adjacent land uses. The 2008 ESA identified the following RECs on the parcel: dredged spoil placement; fly dumping on southeast portions of the site consisting of household waste, paint can, foam, miscellaneous construction debris, asphalt, concrete, and pipes; abandoned cars, waste tires, antifreeze container, scrap metal, car parts, and battery in the central portions of the site; and a 55-gallon drum containing unknown substance in the northern portion of the site. CCA recommended removing the illegally disposed soil and debris from the site and a phase II environmental site investigation to determine if the historical uses of the property affected surface/subsurface soils and groundwater; TTEMI recommended characterization and removal of drums and waste from the site and phase II soil and groundwater sampling.

The City of Chicago contracted with TTEMI to conduct subsequent soil and groundwater sampling at the 17-acre Norfolk/Southern southeast parcel in 2007 (TTEMI 2007 N/S Phase II). In November 2007, Tetra Tech advanced a total of 15 soil borings and collected 36 investigative soil samples and 4 duplicate soil samples. In addition, two of the soil borings were converted to temporary monitoring wells and 2 groundwater samples were collected. Samples were analyzed for PCBs, VOCs, pesticides, metals, and PAHs. Figure 7 indicates sample locations; Tables 7 and 8 include a summary of

analytical results. Results of the investigation suggest that the concentrations of aluminum, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, magnesium, manganese, mercury, nickel, vanadium, and zinc exceed background in one or more soil samples. Concentrations of arsenic, lead, and mercury exceed TACO Tier 1 risk residential in samples NS-SB-08 and NS-SB11. Concentrations of several PAHs found in soil samples exceed background; however, PAH concentrations found in the soil do not exceed TACO risk residential or COSR benchmark values. COSR benchmark values are exceeded for copper, lead, manganese, mercury, vanadium, zinc, DDD, and DDT in samples NS-SB-01, NS-SB-04, NS-SB-07, NS-SB-08, NS-SB-10, NS-SB11, NS-SB-13, and NS-SB-15. Concentrations of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, aluminum, arsenic, barium, copper, iron, lead, manganese, and vanadium exceed the TACO Tier 1 Class II migration to groundwater values in groundwater samples.

10-acre MWRD Parcel – TTEMI 2006

A phase I ESA for the 10-acre MWRD parcel was completed by TTEMI for the City of Chicago in 2006 (TTEMI 2006). The investigation had similar conclusions to other phase I ESAs completed on the Hegewisch Marsh area; dredged spoil placement and fly dumping resulted in a recommendation to conduct phase II soil sampling at the site to determine if contaminated fill materials are present at the site. Subsequent soil sampling in the MWRD parcel conducted in 2006 by TTEMI for the City of Chicago (TTEMI 2006) suggests that the concentrations of cadmium, chromium, lead, and naphthalene exceed background in one or more samples, but do not exceed TACO Tier 1 risk residential. None of the detected metals or PAHs exceed COSR benchmark values. See Table 9 for a summary of results and Figure 8 for sample locations.

Hegewisch Marsh – Truss Storage Area

The northeast corner of the Hegewisch Marsh parcel is designated as the "truss storage area" currently being used for storage of construction materials for the road improvement project at 130th and Torrence (Department of the Army Section 404 Clean Water Act permit LRC-2002-11718). This area will undergo restoration from construction impacts, including removal of all equipment, materials, and establishment of vegetation post-construction. A portion of the truss storage area was proposed for mitigation from wetland impacts associated with the construction of the Ford Calumet Environmental Center (FCEC). The top two feet of material was to be removed to establish 4.5 acres of marsh conditions and placed upland in the truss staging area to create 2.8 acres of mesic to dry prairie to the north (see Figure 9). It is unlikely that the wetland mitigation work for the FCEC will be completed; construction of the FCEC is on hold. Phase II investigations were conducted on this property to determine the feasibility of restoration of the site (TTEMI 2007). Soil sampling conducted in 2006 suggests that the concentrations of arsenic, barium, chromium, lead, mercury, selenium, and silver exceed background in one or more soil samples; concentrations of arsenic exceed TACO Tier 1 risk residential in sample HM-S-27, and there are no exceedances of COSR benchmark value for metals. DDD and DDT concentrations exceed COSR benchmark values in

samples HM-S-25 and HM-S-26. See Table 10 for a summary of results and Figure 10 for sample locations.

Ecological Risk Assessment

Results of the Phase II sampling conducted by TTEMI in 2006 suggested elevated concentrations of metals, PAHs, and pesticides above the COSR threshold/benchmark screening levels. As a follow-up to the 2006 sampling, TTEMI collected a series of vegetation samples to assess the bioavailability of contaminants present in the soil due to the elevated concentrations of contaminants in soil (TTEMI 2007). Macroinvertebrate sampling and earthworm bioassays were conducted to evaluate the potential bioaccumulation of contaminants present in the sediment. In addition, simultaneously extracted metals/acid volatile sulfide (AVS/SEM) analysis was conducted to assess the potential toxic effects in the sediment. Results of supplemental ecotox studies are documented in the Phase II Environmental Ecotoxicological Site Assessment Report prepared by TTEMI in 2009 (TTEMI 2009). Sample locations are shown in Figure 10; supplemental sediment sampling results are provided in Table 11. A summary of findings are presented below:

- Sediment –SEM/AVS results suggest that metal contamination in the sediment is combined with AVS and organic carbon, which makes these metals unavailable, thereby reducing toxicity. TTEMI concluded that sediments can be excluded as an ecological risk at the site.

- Bioavailability – Based on the results of the sediment, vegetation, and macroinvertebrate sampling and the earthworm bioassay, if areas of known metals contamination are removed from site soils discussed below, no significant toxicity from metals or pesticides is expected within the Hegewisch Marsh project area.

- TTEMI suggested that hot spots of lead and other metal contamination should be removed from locations HM-S-16, HM-S-18, SB-10, NS-SB-08, and NS-SB11. Environmental remediation efforts conducted in Hegewisch Marsh to address the elevated concentrations of metals at locations HM-S-16, HS-S-18, and SB-10 are discussed in this report. Phase II reports for the 17-acre Norfolk/Southern parcel (TTEMI 2007 N-S Phase II) representing samples NS-SB-08 and NS-SB11 suggest that elevated concentrations of contaminants were generally found in samples collected adjacent to the proposed FCEC building in the proposed northeast parking lot and between Torrence and the proposed southeast parking lot, both locations were not expected to be significant ecological habitats at the time.

Environmental Remediation

In 2012, the City of Chicago conducted an environmental remediation project at Hegewisch Marsh in the areas previously identified as containing elevated concentrations of metals (see Figure 11). Data included in Tables 12 through 18 was collected by

TTEMI in 2006 and 2007 to delineate the remediation areas (City of Chicago 2011). Although lead was the primary contaminant of concern, exceedances of other metals, such as chromium and zinc, were generally co-located with lead exceedances. A summary of the TTEMI 2006 and 2007 investigations and GSG Consultants 2011 delineation results (Attachment 2) are below:

- ***Area A*** **(Sample location HM-S-16)** Lead exceedances were observed throughout Area A, and generally extended to a depth of two feet, increasing to at least three feet in the east. Area A was horizontally delineated using TACO Tier 1 residential objective with the exception of the far west corner that is slightly over the objective; however the extent of lead exceedances above the COSR benchmark value was horizontally delineated. Vertical exceedances of RCRA hazardous waste criteria (TCLP) and total lead levels extend to at least three feet below ground surface (bgs). Fill material was encountered in Area 16 to approximately thirteen feet bgs; however, sampling of the fill material at depth was not conducted.

- ***Area B*** **(Sample location SB-10)** In Area B, lead exceedances were limited to the upper foot, with the notable exception of a few isolated areas where lead exceedances extended to two feet. Soil containing lead above RCRA hazardous waste criteria was not identified in Area B. The vertical and horizontal extent of chromium contamination above the Tier 1 residential objective was fully delineated. The vertical and horizontal extent of lead contamination in this area was not fully delineated; lead concentrations began increasing in the outer samples both to the west and east.

- ***Area C*** **(Sample location HM-S-18)—** Area C was vertically and horizontally delineated and contamination was generally located in the top 1 foot bgs. In Area C the total lead exceedances were predominately limited to the samples previously identified by Tetra Tech. One sample was identified exceeding TACO residential. The vertical extent was limited to the upper foot and the horizontal extent was delineated. Soil containing lead above RCRA hazardous waste criteria was identified in Area C in 2007 but not in 2011.

Details of the environmental remediation are identified in the City contract documents (City of Chicago 2011 Remediation Plans and Specifications). A summary of activities conducted and additional delineation reports are provided in Attachment 2. Soil remedial activities were limited to areas where lead and chromium concentrations in the soils exceed the site-specific Tier 3 human health risk assessment developed for the Gano Park site, a similar park in within the City of Chicago (IEPA 2011). Though the future site uses at Gano Park and Hegewisch Marsh are slightly different, a child recreation exposure frequency is higher at Gano Park than would be typical for Hegewisch Marsh; therefore, use of the Tier 3 remedial objectives for lead and chromium used at Gano Park are appropriately conservative for Hegewisch Marsh. Lead was remediated to 1169 mg/kg (versus 400 mg/kg TACO Tier 1 residential risk and 430 mg/kg COSR

benchmark) and chromium was remediated to 1710 mg/kg (versus 10 mg/kg TACO Tier 1 risk residential and 1.3 mg/kg COSR benchmark):

- HM-S-16 (Area A) was remediated using the Tier 3 human health risk remediation objective developed for Gano Park (IEPA 2011) and materials encapsulated on-site (see Figure 12 for remediation limits). Approximately two feet of fill was placed on existing grade in ~26,500 square feet in Area A (one foot of topsoil over one foot of general fill- meeting TACO Tier l standard) over a orange now fence marker bed to identify and encapsulate areas delineated with soils exceeding the RCRA hazardous waste criteria and total lead TACO Tier 3 exceedances. Soils were stabilized with native seeding. All excavated materials were removed from the site and properly disposed in a Subtitle D landfill.

- The full extent of lead contamination was not delineated to Tier 3 at SB-10 (Area B); one foot of on-site material was removed from 5,000 square feet of Area B and replaced with topsoil to grade (see Figure 13 for remediation limits). New topsoil was stabilized with native seeding. All excavated materials were removed from the site and properly disposed in a Subtitle D landfill. Total lead concentrations increase above the Tier 3 human health risk value in the western and eastern samples in the zone; this is justification to further define the boundaries using total lead concentrations in the soil during design

- The full extent of contamination was delineated at HM-S-18 (Area C); one foot of on-site material was removed from 400 square feet in Area C and replaced with topsoil to grade (see Figure 14 for remediation limits). New topsoil was stabilized with native seeding. It is unclear why additional delineation sampling conducted in Area C by GSG did not reproduce the RCRA hazardous waste exceedance identified in 2007 sampling conducted by TTEMI.

Coordination with the local sponsor (Chicago Park District) suggests that Hegewisch Marsh was/has not been formally enrolled in State voluntary clean-up program, nor is the site regulated under RCRA or CERCLA. Any remediation conducted at the site has been voluntary in nature using the TACO Tier 3 remedial objectives and COSR Ecotox Protocol as guidance. Though the approval for remedial activities conducted at Hegewisch Marsh is not formal process, staff from the IEPA, IDNR, USFWS, and USEPA (members of the Calumet Ecotox Management and Technical Team) have been given the opportunity to review and approve the remedial strategy at the site (City of Chicago e-mail 2011). See Attachment 3 for documentation and approval from the agencies. In addition, various cap designs are used around the City of Chicago for sites enrolled in the State formal voluntary site remediation program depending on the final end use of the property and other site-specific considerations. No further remediation has been approved by IEPA on several sites with elevated levels of lead throughout the City (Attachment 4). No additional remediation is planned at the Hegewisch Marsh site in the future nor will the site be enrolled in the State voluntary remediation program.

DATABASE SEARCH

A search of available environmental records was conducted utilizing online resources. The conclusions drawn and documented herein are based on data posted by the Illinois Environmental Protection Agency (IEPA), and the U.S. Environmental Protection Agency (EPA) obtained through online database search and mapping tools. Results are provided in Attachment 5 and summarized in Table 19. No new RECS were identified in the environmental records review. Information used to complete the records review was obtained from the following informational resources:

- Illinois Environmental Protection Agency online map server (http://maps.epa.state.il.us/website/remediation/viewer.htm). The Illinois EPA's Map Server provides a wide variety of environmental GIS data. The web pages note the locations of and information about sites that are part of the Voluntary Site Remediation Program or the Leaking Underground Storage Tank (Leaking UST) Site Remediation Program.

- U.S. Environmental Protection Agency (http://www.epa.gov/emefdata/em4ef.hom) EnviroMapper for Envirofacts. EnviroMapper is a single point of access to select U.S. EPA environmental data. The Web site provides access to several EPA databases that provide information about environmental activities that may affect air, water, and land quality anywhere in the United States. Databases linked to the EnviroMapper include: air emissions (AIRS/AFS), Superfund sites (CERCLIS), toxic releases (TRI), hazardous waste (RCRAInfo), waste dischargers (PCS), and Brownfields (ACRES).

CERCLIS

The Comprehensive Environmental Response, Compensation, and Liability, Information System (CERCLIS) contains data on any potential hazardous waste site that has been reported by states, municipalities, private companies, or private persons pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The CERCLIS database indicates the stages of evaluation and remediation that have been completed for any given site. The CERCLIS database includes the National Priority List (NPL), which identifies over 1,200 sites for priority cleanup under the Superfund program, and the CERCLIS-No Further Remedial Action Planned (NFRAP) List, which includes a listing of sites that have been removed from CERCLIS, for various reasons. There are no CERCLIS sites within the recommended search distance.

RCRIS

The Resource Conservation and Recovery Information System (RCRIS) lists sites which generate, transport, store, and/or dispose of hazardous waste defined by the Resource Conservation and Recovery Act (RCRA). The RCRIS database includes RCRA Corrective Action Report (CORRACTS), which identify hazardous waste handlers with RCRA corrective action activity; RCRA treatment, storage, and disposal facilities (TSDFs), and RCRA conditionally exempt small quantity generators (CESQGs), RCRA small quantity generators (SQGs), and large quantity generators (LQGs) facilities. There are eleven RCRIS sites within the recommended search distance.

AFS

The Air Facility System (AFS) contains compliance and permit data for stationary sources of air pollution (such as electric power plants, steel mills, factories, and universities) regulated by EPA, state and local air pollution agencies. The information in AFS is used by the states to prepare State Implementation Plans (SIPs) and to track the compliance status of point sources with various regulatory programs under the Clean Air Act. There are ten AFS sites in the USEPA Envirofacts database near the project area.

PCS/ICIS

The Permit Compliance System (PCS) and Integrated Compliance Information System (ICIS) databases provide information on companies which have been issued permits to discharge wastewater into rivers. There are four sites in the PCS/ICIS database near the project area.

TSCA

The Toxic Substances Control Act of 1976 provides EPA with authority to require reporting, record-keeping and testing requirements, and restrictions relating to chemical substances and/or mixtures. Certain substances are generally excluded from TSCA, including, among others, food, drugs, cosmetics and pesticides. TSCA addresses the production, importation, use, and disposal of specific chemicals including

polychlorinated biphenyls (PCBs), asbestos, radon and lead-based paint. There is one TSCA site in the USEPA Envirofacts database near the project area.

SSU

A State equivalent CERCLIS database: the State Response Action Program database identifies the status of all sites under the responsibility of the Illinois EPA's State Sites Unit. These sites may or may not have already been listed on the federal CERCLIS list. There are no SSU sites on or near the project area.

LUST

The Illinois State Fire Marshall maintains a listing of registered underground storage tanks (UST), as required by RCRA Subtitle I. The Illinois Environmental Protection Agency maintains a listing of leaking underground storage tank reports (LUST). There are seven LUST activities near the project area.

SRP

The Site Remediation Program (SRP) database lists all voluntary remediation projects administered through the pre-notice site clean-up program (1989 to 1995) and the site remediation program (1996 to present). There are two SRP sites near the project area.

Table 19 – Environmental Database Review

Database	Site Name	Location	Status	Potential Impact
RCRIS SRP AFS PCS/ICIS	Allied Chemical American Sweetener Crompton & Knowles	*2400 E 130th Street*	Allied Chemical facility is current SQG with no violations. SRP NFR recorded 1/25/2013. American Sweet – has a CAA minor operating permit. No violations. Crompton – expired CWA minor discharge permit. No violations.	Unlikely facility activities have impacted project area or will impact project implementation.
RCRIS	Brainard Cleaners	*13237 Brainard Ave*	Current RCRA SQG – no violations.	Unlikely facility activities have impacted project area or will impact project implementation
AFS	Marathon Pipeline	*2530 E 130th St*	Inactive CAA minor operating permit. Facility closed.	Unlikely facility activities have impacted project area or will impact project implementation
RCRIS	Centerpoint Properties Chicago Enterprise Center Welded Tube	*13535 S Torrence*	Previous RCRA generators, no violations.	Unlikely facility activities have impacted project area or will impact project implementation
RCRIS AFS PCS/ICIS TSCA	Chemtrade Logistics	*2250 E 130th Street*	AFS – CAA minor operating permit, no violations. CWA minor permit, expired, no	Unlikely facility activities have impacted project area or will impact project implementation

Database	Site Name	Location	Status	Potential Impact
			violations. RCRA active SQG, no violations.	
RCRIS	Chicago DOT	*2050 E 130th Street*	RCRA previous SQG, no violations.	Unlikely facility activities have impacted project area or will impact project implementation
RCRIS PCS/ICIS AFS LUST	E&L Transport Ford Motor Company Nu-Car Carriers	*13511 S Torrence*	E&L active RCRA SQG, no violations. Previous minor CWA discharger, no violations. Ford previous CAA minor operating permit, no violations. Nu-Car LUST IEMA 903798, 920864, 921152 – all diesel spills from 4/30/1992, 4/3/1992, and 12/26/1990. No NFRs recorded.	Due to proximity and date of previous LUST activities at the site, its unlikely that any remaining contamination will impact project implementation – soil movement on-site is limited. Unlikely other facility activities have impacted project area or will impact project implementation.
RCRIS AFS AFS	MWRDGC Torrence Avenue Tunnel Baja Contractors Kenny Kieweit Shea	*1801 E 134th St*	MWRDGC – active RCRA CESQG, no violations. Baja & Kenny – inactive CAA minor operating permit, facility/activities closed.	Unlikely facility activities have impacted project area or will impact project implementation.

Database	Site Name	Location	Status	Potential Impact
RCRIS LUST	Norfolk-Southern Railway Care Carriers	*13101 Torrence Ave*	Norfolk Southern previous RCRA generator, no violations. LUST IEMA 913125 NFR dated 9/29/2005	Unlikely facility activities have impacted project area or will impact project implementation.
RCRIS	SCRAP Corporation of America	*12901 Stony Island*	Active RCRA SQG, noncompliance actions. Facility waste piles do not meet the RCRA TSD standards.	Due to proximity of site to the project area, with multiple physical and hydrologic barrier between the sites, its unlikely that any issues at the facility have impacted the project area.
AFS	Container Recycling	*135th and Torrence*	Inactive CAA minor operating permit. Facility closed.	Unlikely facility activities have impacted project area or will impact project implementation
AFS	Illinois Mining	*130th west of Torrence*	Inactive CAA minor operating permit. Facility closed.	Unlikely facility activities have impacted project area or will impact project implementation
AFS PCS/ICIS TRI	Lafarge North America	*2150 E 130th St*	Current CAA minor operating permit, no violations. Previous CWA minor permit, no violations.	Unlikely facility activities have impacted project area or will impact project implementation
LUST SRP	City of Chicago DOT	*13007 Torrence*	LUST IEMA 20121279 declared non-LUST 4/2/2013. Site transferred to SRP. SRP active.	Due to proximity of SRP site to the project area, with multiple physical barriers between the sites, its unlikely that any remaining contamination will impact project implementation – soil movement on-site is limited. Unlikely other facility activities have impacted project area or will impact project implementation.

Database	Site Name	Location	Status	Potential Impact
LUST	USACE – Obrien Lock and Dam	*1615 E 130th St*	LUST, gasoline, 20-day status report dated 10/21/2011. NFR not recorded.	Site is down gradient to project. Unlikely to impact project implementation.
LUST	Singer, Mike	*13000 S Torrence*	LUST IEMA 933023, gasoline and diesel, 11/19/1993. 45-day report field 8/1/1994. No NFR recorded.	Site is down gradient to project. Unlikely to impact project implementation.

FINDINGS AND CONCLUSIONS

This HTRW investigation was performed to determine if HTRW and non-HTRW environmental issues at the Hegewisch Marsh project site, or surrounding area, have impacted the project site or will impact implementation of the proposed restoration measures. According to ER 1165-2-132, non-HTRW environmental issues that do not comply with federal, state, and local regulations should be discussed in the HTRW evaluation along with HTRW issues. The investigation identified HTRW and non-HTRW issues at the project site that may have an impact on the implementation of the proposed project. No HTRW investigation can wholly eliminate uncertainty regarding the potential for HTRW associated with a project area. Performance of the HTRW investigation is intended to reduce, but not eliminate, uncertainty regarding the potential for HTRW in connection with a project area.

The conceptual site model, including known RECs (HTRW and non-HTRW issues), and appropriate measures and recommendations to resolve the issues, are discussed below. Note that the site has been divided into five (5) distinct zones (A, B, C, D, and Truss Storage Area) based on this investigation and is depicted in Figure 15.

Zone A – Former Remediation Area A.

Concentrations of lead in soils capped in Remediation Area A exceed COSR benchmark value, TACO Tier 3 human health risk remediation objective, and RCRA hazardous waste criteria. The cap consists of one-foot of topsoil placed over one-foot of general clean limestone fill and is not suitable to mitigate human health and ecological risks. Concerns have been raised by the Calumet working group that deep rooted vegetation and burrowing animals may be at risk in this area with a limited cap design. Informal communication with IEPA suggests that the remedial approach was approved by IEPA with access restrictions to prevent on-site exposure. Recommend removing Zone A (Remediation Area A) from the USACE project limits to avoid existing impacts. Concur with IEPA's recommendation that the Chicago Park District design and install natural barriers in the area to discourage site users from entering. Note that this action would be separate and not associated with any USACE design or construction contract.

Zone B – Former Remediation Areas B and C.

Relatively elevated concentrations of lead ranging from 480 to 5,100 mg/kg exist outside the limits of the Remediation Area B, indicating that the area hasn't been fully delineated to the Tier 3 human health risk remediation objective. Composite soil sampling collected in Area C suggest soils exceeded RCRA hazardous waste criteria for lead (57 mg/L versus 5 mg/L); however, GSG could not replicate the results in subsequent sampling. Recommend removing Zone B from the USACE project limits to avoid existing impacts. Additional sampling is recommended to determine the true extent of lead contamination in Remediation Areas B and C and potentially reduce the footprint of Zone B as depicted on Figure 15. Any required remediation will be conducted by the Chicago Park District. Concur with IEPA's recommendation that the Chicago Park District design and install

natural barriers in the area to discourage site users from entering. Note that this action would be separate and not associated with any USACE design or construction contract.

Zone C – Human Health and Ecological risk.

Zone C was removed from the USACE project area and will be restored by others. If the area were to be reconsidered as part of the USACE restoration project in the future, additional sampling and/or coordination with IEPA will be required to fully delineate the areas requiring remedial action. The 2009 Phase II Environmental Ecotoxicological Site Assessment Report suggests that elevated concentrations of lead were found at NS-SB08 and NS-SB11 above the Tier 3 human health risk remediation objective. These areas were assumed to not be significant ecological habitats; however, because the FCEC and associated engineered barriers may not be constructed on-site, this area continues to represent a potential human health and ecological risk to site users. Any required remedial action will be conducted by the Chicago Park District.

Truss storage area.

Truss Storage area was removed from the USACE project area and will be restored by others. If the area were to be reconsidered as part of the USACE restoration project in the future, additional site inspection in the truss storage area is required to confirm that the Contractor using the area for the 130th and Torrence Avenue project has removed all materials post-construction and restored the site to its original grade.

Zone D – USACE Project Area

Ecological Risk. One or more soil and/or sediment samples collected from Hegewisch Marsh exceed the COSR Benchmark value (or LOAEL). The framework for the COSR ecotoxicological protocol allows for site-specific assessments, including bioavailability and toxicity testing, AVS-SEM analysis, and other assessment to determine if the remaining contamination is a risk for receptors currently using the site and for planning future restoration of the site. Outside of the areas identified in Zones A, B, and C, USACE planning efforts to restore habitat and increase species diversity and abundance at the site through surficial soil disturbance and plantings can be conducted without imposing unnecessary ecological risk. No additional site specific assessments are recommended to address ecological risks in the future. The maximum soil disturbance must be limited to within one-foot of existing grade to reduce the potential human health or ecological risks associated with significant earthwork and/or grade changes at the site.

Fly dumping. Recommend that the local sponsor address the continued fly dumping problem at Hegewisch Marsh and implement measures on-site to prevent future fly dumping activities prior to USACE restoration activities.

Soil Management. Samples collected at HM-S-09, HM-S-10, HM-S-14, HM-S-15, and HM-S-27 exceed TACO Tier 1 residential risk values for arsenic. Earthwork shall be limited to surficial grading with no excavation and movement of materials on or off site.

In addition, measures to prevent erosion and prevent migration of materials off-site should be implemented during construction, including dust control practices, soil erosion and sediment controls and site-specific storm water pollution prevention plan (SWPPP) to include silt fence, gravel ingress/egress, tire washing, and other BMPs as necessary. Contract shall require construction of geotextile lined gravel lay down areas for contractor staging and storage.

The proposed conceptual site plan addresses potential risk identified by removing from the project areas that represent a high risk. Further delineation during subsequent project phases will refine the areas (Zone B) to be excluded from the project, to ensure that USACE avoids areas that represent a potentially higher risk of future liability. Removing Zones A – C and the truss storage area from the project footprint does not compromise the potential project benefits, since the bulk of the continuous habitat is still intact and habitat benefits will be realized from the restoration of the majority of the site. The proposed removal of Zones A – C and the truss storage are from the project footprint is cost effective, since no work will be done on the removed areas and no federal dollars will be committed to those areas. The proposed conceptual site plan addresses risk mitigation for USACE while maintaining project benefits.

REFERENCES

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Table 1: 2002 Hegewisch Marsh Soil Sampling Results (all units mg/kg unless noted) - URS

Parameter	Area 1	Area 2			Area 3		Area 4						Area 5			IEPA TACO		Calumet Open Space Reserve		
	SB-13	SB-10	SB-11	SB-12	SB-14	SB-15	SB-1	SB-2	SB-3	SB-4	SB-5	SB-6	SB-7	SB-8	SB-9	Residential	Class II Groundwater	Soil Background	Soil Threshold	Soil Benchmark
	12-14 ft	2-4 ft	0-2 ft	12-14 ft	10-12 ft	10-12 ft	14-16 ft	12-14 ft	18-20 ft	0-2 ft	12-14 ft	16-18 ft	18-20 ft	2-4 ft	0-2 ft					
Metals																				
Arsenic	2.9	9.4	**16**	3	ND	ND	5.6	2	2	0.92	2.2	1.2	8.1	9.8	7.1	13	NA	13	18	31
Barium	43	150	41	10	360	490	55	5.8	8.7	480	10	6.7	68	55	64	5,500	NA	110	330	585
Cadmium	ND	1.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	78	NA	0.6	0.4	3.37
Chromium	15	45	22	6.1	36	25	20	7.1	7.9	37	6.5	4.4	23	18	22	230/1710*	NA	16.2	26	131
Lead	9.9	400	22	6.6	5.1	1.1	8.6	3.7	5.2	0.84	52.5	3.8	9.3	16	22	400/1169*	NA	36	16	430
Mercury	ND	0.33	0.033	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.041	0.031	10	NA	0.06	0.07	1.3
Selenium	ND	ND	ND	ND	2.9	4.6	ND	ND	ND	5.4	ND	ND	ND	ND	ND	390	NA	0.48	0.8	1
Silver	ND	ND	ND	ND	32	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	390	NA	0.55	0.4	2
PAHs																				
Acenaphthylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.074	NA	NA	0.03	NA	NA
Anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.028	23000	59000	0.25	11400	51000
Benzo(a)anthracene	ND	0.079	0.049	ND	0.05	0.018	ND	ND	ND	ND	ND	ND	ND	ND	0.15	1.1	8	1.1	NA	NA
Benzo(b)flouranthene	ND	0.096	0.077	ND	0.056	0.27	ND	ND	ND	ND	ND	ND	ND	ND	0.19	1.5	25	1.5	1	10
Benzo(k)fluoranthene	ND	0.071	0.05	ND	0.05	0.25	ND	ND	ND	ND	ND	ND	ND	ND	0.13	9	250	0.99	1	10
Benzo(ghi)perylene	ND	0.06	0.048	ND	ND	0.2	ND	ND	ND	ND	ND	ND	ND	ND	0.074	NA	NA	0.68	NA	NA
Benzo(a)pyrene	ND	0.086	0.07	ND	0.059	0.38	ND	ND	ND	0.042	ND	ND	ND	ND	0.19	1.3	82	1.3	11.3	113
Chrysene	ND	0.1	0.062	ND	0.056	0.18	ND	ND	ND	ND	ND	ND	ND	ND	0.19	88	800	1.2	NA	NA
Dibenzo(ah)anthracene	ND	ND	ND	ND	ND	0.093	ND	ND	ND	ND	ND	ND	ND	ND	0.038	0.2	7.6	0.2	NA	NA
Flouranthene	ND	0.17	0.073	ND	0.058	0.13	ND	ND	ND	ND	ND	ND	ND	ND	0.11	3100	21000	2.7	NA	NA
Indeno(123-cd)pyrenene	ND	0.053	0.043	ND	ND	0.2	ND	ND	ND	ND	ND	ND	ND	ND	0.068	0.9	69	0.86	1	10
Naphthalene	ND	0.038	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	170	18	0.04	852	1700
Phenanthrene	ND	0.17	0.039	ND	ND	0.046	ND	ND	ND	ND	ND	ND	ND	ND	0.06	NA	NA	1.3	5	50
Pyrene	ND	0.13	0.065	ND	0.048	0.12	ND	ND	ND	ND	ND	ND	ND	ND	0.17	2300	21000	1.9	83	1350
VOCs																				
Benzene	0.26	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.8	0.17	NA	NA	NA
Carbon disulfide	ND	ND	ND	ND	0.013	0.018	ND	ND	0.017	ND	0.013	ND	ND	ND	ND	720	160	NA	NA	NA

Bold = exceedance TACO Tier 1 or Tier 3 (lead and chromium)

= remediation zone (location S-16 material capped, locations S-18 and S-10 upper 1-foot material removed)

= exceedance of COSR threshold

= exceedance of COSR benchmark

ND = not detected

NA = not available

* Upper value is the TACO Tier 3 site-specific human health risk remedial objective

Table 2: 2002 Proposed Mitigation Site Sampling (all units in mg/kg unless states otherwise) - TTEMI

Parameter	SB02	SB04	SB04Dup	SB06	SB08	IEPA TACO		Calumet Open Space		
	12-14 ft	2-4 ft	0-2 ft	12-14 ft	10-12 ft	Residential	Class II Groundwater	Soil Background	Soil Threshold	Soil Benchmark
Metals										
Aluminum	7800	11000	10000	9300	11000	ND	NA	9500	NA	NA
Antimony	< 2.2	< 2	< 1.8	< 2.2	< 2.1	31	NA	4	0.3	65
Arsenic	8.8	8.1	7.2	11	11	13	NA	13	18	31
Barium	44	44	44	27	35	5,500	NA	110	330	585
Beryllium	0.54	0.63	0.58	0.59	0.67	160	NA	0.59	21	48
Cadmium	0.37	0.58	0.52	0.38	0.37	78	NA	0.6	0.4	3.37
Chromium	17	27	56	17	21	230/1710*	NA	16.2	26	131
Cobalt	10	13	10	16	14	4,700	NA	8.9	13	102
Copper	26	40	37	40	33	2,900	NA	19.6	54	190
Lead	36	31	31	18	23	400/1169*	NA	36	16	430
Magnesium	10000	24000	26000	28000	26000	325,000	NA	NA	NA	NA
Manganese	330	470	440	470	430	1,600	NA	636	152	500
Mercury	< 0.039	< 0.037	< 0.038	< 0.038	< 0.037	10	NA	0.06	0.07	1.3
Nickel	23	34	31	36	33	1,600	NA	18	44	210
Selenium	< 1.1	< 0.99	< 0.089	0.46 B	< 1.1	390	NA	0.48	0.8	1
Silver	< 0.56	< 0.49	< 0.28	< 0.54	< 0.53	390	NA	0.55	0.4	2
Thallium	< 1.1	< 0.99	< 0.89	< 1.1	< 1.1	6.3	NA	0.32	0.86	1.3
Vanadium	28	24	22	21	24	550.0	NA	25.2	8	43
Zinc	62	87	83	62	71	23,000	NA	95	113	250
Pesticides/PCBs/Dioxins										
DDE	< 0.01	0.0075	0.0092	< 0.0098	< 0.0095	2	270	NA	0.004	0.04
DDT	< 0.0039	0.023	0.029	< 0.0098	< 0.0095	2	160	NA	0.004	0.04

= exceedance of COSR threshold

= exceedance of COSR benchmark

ND = not detected

NA = not available

* Upper value is the TACO Tier 3 site-specific human health risk remedial objective

Table 3: 2006 100-acre Hegewisch Marsh Parcel Sampling (all units in mg/kg unless states otherwise) - TTEMI

* deep sample s colleced at 9, 10, and 11, just in case excavation for creation of wetland, mudflat, or marsh (in old river channel)

Parameter	HM-S-01-01	HM-S-02-01	HM-S-03-01	HM-S-04-01	HM-S-05-01	HM-S-06-01	HM-S-07-01	HM-S-08-01	HM-S-09-04	HM-S-10-04	HM-S-11-04	HM-S-12-01	HM-S-12-01D	HM-S-13-01	HM-S-14-01	HM-S-15-01	HM-S-16-01	HM-S-16-01D	HM-S-17-01	HM-S-18-01	IEPA TACO Residential	IEPA TACO Class II Groundwater	Calumet Open Space Soil Background	Calumet Open Space Soil Threshold	Calumet Open Space Soil Benchmark
	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 4 ft	0 - 4 ft	0 - 4 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft					
Metals																									
Antimony	1.15	1.25	2.25	1.35	1.15	0.9	1.15	1.1	1.15	1.15	1.25	1.25	1.3	1.15	1.25	3.1	11	7.2	1.75	31	31	NA	4	0.3	65
Arsenic	9.3	10	8	6.2	8.7	4.8	6.6	10	**14**	**16**	5.4	6.1	5.9	5.1	**26**	32	10	12	9	9.5	13	NA	13	18	31
Beryllium	0.7	0.82	0.55	0.85	0.69	2.9	0.81	0.63	1	0.75	0.64	0.32	0.315	1.4	0.81	0.285	1.5	2.4	0.93	0.65	160	NA	0.59	21	48
Cadmium	0.79	1.8	1.9	1.2	0.285	0.88	0.75	0.79	0.62	0.29	0.3	0.32	0.315	0.275	5.5	1.8	1.9	1.9	0.99	8.6	78	NA	0.6	0.4	3.37
Chromium	18	32	25	26	18	22	20	17	11	20	19	16	17	16	96	58	61	96	29	730	230/1710	NA	16.2	26	131
Copper	38	38	36	29	21	25	18	25	20	18	19	23	24	15	81	200	98	100	34	1200	2,900	NA	19.6	54	190
Lead	82	91	5	82	14	37	18	38	30	14	12	38	41	29	300	250	28000	40000	78	580	400/1169	NA	36	16	430
Mercury	0.22	0.15	0.085	0.069	0.014	0.014	0.014	0.048	0.032	0.0145	0.044	0.038	0.0145	0.037	0.41	0.15	0.23	0.24	0.093	0.13	10	NA	0.06	0.07	1.3
Nickel	30	29	26	31	27	14	29	29	22	35	30	21	22	14	39	53	35	52	37	32	1,600	NA	18	44	210
Selenium	0.55	0.65	1.1	0.7	0.55	1.6	0.55	0.55	0.6	0.6	0.6	0.65	0.65	0.55	0.6	0.55	0.55	1.3	0.9	0.6	390	NA	0.48	0.8	1
Silver	0.55	0.65	1.1	0.7	0.55	1.6	0.55	0.55	0.6	0.6	0.6	0.65	0.65	0.55	0.6	0.55	0.55	0.55	0.9	0.6	390	NA	0.55	0.4	2
Thallium	1.2	0.65	1.1	0.7	0.55	0.455	0.55	1.1	0.6	0.6	0.6	0.65	0.65	0.55	0.6	0.55	0.55	0.55	0.9	0.6	6.3	NA	0.32	0.86	1.3
Zinc	92	210	240	150	48	67	74	82	61	56	66	96	92	62	960	550	690	610	190	620	23,000	NA	95	113	250
Pesticides																									
DDD	0.0019	0.012	0.81	0.14	0.00195	0.016	0.00195	0.012	0.0098	0.00195	0.0065	0.01	0.082	0.036	0.038	0.017	0.0061	0.005	1	0.021	3	80	NA	0.004	0.04
DDE	0.0046	0.022	0.062	0.029	0.012	0.019	0.00195	0.012	0.0063	0.012	0.002	0.013	0.13	0.029	0.02	0.026	0.0019	0.0019	0.069	0.045	2	270	NA	0.004	0.04
DDT	0.0062	0.04	0.25	0.088	0.0059	0.012	0.00195	0.016	0.00195	0.012	0.0057	0.00215	0.044	0.0087	0.027	0.081	0.018	0.016	0.13	0.018	2	160	NA	0.004	0.04
PAHs																									
Acenaphthene	0.054	0.0215	0.0395	0.018	0.015	0.0145	0.015	0.00195	0.015	0.0145	0.015	0.0165	0.021	0.0195	0.0215	0.02	0.19	0.078	0.083	0.0205	4700	2900	0.09	4	20
Acenaphthylene	0.062	0.0215	0.0395	0.018	0.015	0.0145	0.015	0.00195	0.015	0.0145	0.015	0.0165	0.021	0.0195	0.044	0.02	0.1	0.082	0.032	0.0205	NA	NA	0.03	NA	NA
Anthracene	0.31	0.092	0.0395	0.018	0.015	0.0145	0.015	0.00195	0.015	0.0145	0.015	0.0165	0.21	0.0195	0.083	0.02	0.5	0.14	0.071	0.0205	23000	59000	0.25	11400	51000
Benzo(a)anthracene	1.2	0.31	0.17	0.057	0.015	0.08	0.015	0.00195	0.015	0.0145	0.015	0.073	0.065	0.063	0.38	0.2	1.5	1.1	0.25	0.11	1.1	8	1.1	NA	NA
Benzo(a)pyrene	0.59	0.17	0.1	0.055	0.015	0.077	0.015	0.00195	0.015	0.0145	0.015	0.049	0.021	0.0195	0.26	0.12	1.1	0.99	0.14	0.0205	1.3	82	1.3	11.3	113
Benzo(b)Fluoranthene	1	0.27	0.17	0.078	0.015	0.1	0.015	0.00195	0.015	0.0145	0.015	0.075	0.021	0.0195	0.43	0.02	1.4	1.3	0.032	0.0205	1.5	25	1.5	1	10
Benzo(ghi)perylene	0.36	0.11	0.0395	0.018	0.015	0.046	0.015	0.00195	0.015	0.0145	0.015	0.0165	0.021	0.0195	0.19	0.076	0.54	0.57	0.077	0.049	NA	NA	0.68	NA	NA
Benzo(k)fluoranthene	0.35	0.13	0.0395	0.018	0.015	0.059	0.015	0.00195	0.015	0.0145	0.015	0.036	0.021	0.0195	0.16	0.02	0.72	0.6	0.032	0.0205	9	250	0.99	1	10
Chrysene	1.3	0.39	0.23	0.086	0.015	0.11	0.015	0.00195	0.015	0.0145	0.015	0.1	0.064	0.079	0.5	0.17	1.2	0.81	0.16	0.082	88	800	1.2	NA	NA
Dibenzo(ah)anthracene	0.12	0.0215	0.0395	0.018	0.015	0.0145	0.015	0.00195	0.015	0.0145	0.015	0.0165	0.021	0.0195	0.052	0.065	0.2	0.12	0.11	0.0205	0.2	7.6	0.2	NA	NA
Fluoranthene	2.3	0.69	0.4	0.1	0.015	0.14	0.015	0.00195	0.015	0.0145	0.015	0.13	0.11	0.13	0.62	0.26	2.5	1.2	0.45	0.14	3100	21000	2.7	NA	NA
Fluorene	0.074	0.0215	0.0395	0.018	0.015	0.0145	0.015	0.00195	0.015	0.0145	0.015	0.0165	0.021	0.0195	0.0215	0.02	0.17	0.043	0.096	0.0205	3100	2800	0.1	6	30
Indeno(123-cd)pyrenene	0.38	0.1	0.0395	0.018	0.015	0.046	0.015	0.086	0.015	0.0145	0.015	0.0165	0.021	0.0195	0.17	0.147	0.66	0.67	0.19	0.12	0.9	69	0.86	1	10
Naphthalene	0.15	0.07	0.0395	0.018	0.015	0.0145	0.015	0.00195	0.015	0.0145	0.015	0.0165	0.021	0.0195	0.083	0.052	0.14	0.12	0.077	0.049	170	18	0.04	852	1700
Phenanthrene	2.1	0.42	0.0395	0.058	0.034	0.11	0.032	0.047	0.015	0.031	0.052	0.077	0.059	0.0195	0.33	0.16	1.8	0.57	0.19	0.082	NA	NA	1.3	5	50
Pyrene	2	0.59	0.33	0.093	0.015	0.13	0.015	0.051	0.015	0.0145	0.015	0.12	0.093	0.11	0.63	0.27	2.3	1.1	0.39	0.13	2300	21000	1.9	83	1350
SVOCs																									
4-Chloroaniline	0.1	0.11	0.205	0.125	0.1	0.1	0.1	0.1	0.1	0.1	0.105	0.11	0.11	0.1	0.29	0.1	0.1	0.1	0.165	0.105			NA	NA	NA
Bis(2-ethyl hexyl)phalate	0.1	0.11	0.205	0.125	0.1	0.1	0.1	0.1	0.1	0.1	0.105	0.11	0.11	0.1	0.33	0.1	0.1	0.1	0.165	0.105			NA	NA	NA

Bold = exceedance TACO Tier 1 or Tier 3 (lead and chromium)

= exceedance of COSR threshold

= exceedance of COSR benchmark

= remediation zone (location S-16 material capped, locations S-18 and S-10 upper 1-foot material removed)

ND = not detected

NA = not available

* Upper value is the TACO Tier 3 site-specific human health risk remedial objective

Table 4: 2006 100-acre Hegewisch Marsh Soil Sampling TCLP - TTEMI

Parameter	HM-S-04-01	HM-S-04A-01	HM-S-04B-01	HM-S-04C-01	HM-S-04C-01D	HM-S-04D-01	RCRA TCLP Regulatory Limit
	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	
Metals							
Arsenic, TCLP	0.005	0.005	0.005	0.005	0.005	0.005	5
Barium, TCLP	0.47	0.17	0.38	0.27	0.26	0.59	100
Cadmium, TCLP	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	1
Chromium, TCLP	0.005	0.005	0.005	0.005	0.005	0.005	5
Lead, TCLP	0.018	0.05	0.018	0.017	0.016	0.029	5
Mercury, TCLP	0.000125	0.000125	0.000125	0.000125	0.000125	0.000125	0.20
Selenium, TCLP	0.005	0.005	0.005	0.005	0.005	0.005	1
Silver, TCLP	0.05	0.05	0.05	0.05	0.05	0.05	5

Table 5: 2006 100-acre Hegewisch Marsh Initial Sediment Sampling (all units in mg/kg unless states otherwise) - TTEMI

Parameter					IEPA TACO		Calumet Open Space Reserve			Calumet Open Space Reserve	
	HM-SD-01	HM-SD-02	HM-SD-03	HM-SD-04	Residential	Class II Groundwater	Background	Sediment Threshold	Sediment Benchmark	Site-specific Threshold	Site-specific Benchmark
Metals											
Arsenic	13	11	13	9.7	13	NA	26.4	9.79	33	NA	NA
Cadmium	0.95	2	2.3	1.05	78	NA	3.7	0.99	4.98	NA	NA
Chromium	34	33	40	32	230/1710*	NA	69.9	43.4	111	NA	NA
Copper	40	42	53	36	2,900	NA	99.9	31.6	149	NA	NA
Lead	180	170	180	180	400/1169*	NA	538	35.8	128	NA	NA
Mercury	0.14	0.11	0.14	0.1	10	NA	0.47	0.18	1.06	NA	NA
Nickel	21	27	34	19	1,600	NA	49.2	22.7	48.6	NA	NA
Zinc	340	340	380	310	23,000	NA	761	121	459	NA	NA
PAHs											
Benzo(a)anthracene	0.34	0.22	0.18	0.34	1.1	8	2.91	0.11	1.05	3.95	37.7
Benzo(a)pyrene	0.22	0.16	0.12	0.23	1.3	82	2.99	0.15	1.45	5.39	52.1
Benzo(b)fluoranthene	0.34	0.055	0.16	0.07	1.5	25	2.69	10	ND	359	ND
Benzo(ghi)perylene	0.14	0.055	0.042	0.14	ND	ND	2.2	0.17	3.2	6.1	115
Benzo(k)fluoranthene	0.14	0.055	0.042	0.07	9	250	2.7	0.24	13.4	8.62	481
Chrysene	0.48	0.32	0.19	0.47	88	800	3.76	0.17	1.29	6.1	46.3
Fluoranthene	0.81	0.53	0.32	0.77	3100	21000	9.07	6.2	6.2	223	223
Naphthalene	0.065	0.055	0.042	0.14	170	18	0.2	0.47	0.56	16.9	20.1
Phenanthrene	0.25	0.12	0.16	0.2	ND	ND	3.7	1.8	1.8	64.6	64.6
Pyrene	0.65	0.42	0.28	0.64	2300	21000	7.77	0.2	1.52	7.18	54.6
Pesticides											
DDD	0.44	1	0.059	0.25	3	80	1.25	0.005	0.06	0.18	2.15
DDE	0.066	0.14	0.055	0.058	2	270	0.14	0.003	0.03	0.108	1.08
DDT	0.027	0.16	0.013	0.021	2	160	0.75	0.004	0.03	0.144	1.08

Bold = exceedance TACO Tier 1 or Tier 3 (lead and chromium)

= exceedance of COSR threshold

= exceedance of COSR benchmark

* Upper value is the TACO Tier 3 site-specific human health risk remedial objective

ND = not detected

NA = not available

Table 6: 2006 100-acre Hegewisch Marsh Surface Water Sampling (all units in mg/L unless states otherwise) - TTEMI

Parameter	HM-SW-01	HM-SW-02	HM-SW-03	HM-SW-04	HM-SW-04D	IEPA WQS			Calumet Open Space Reserve		
						Acute Aquatic	Chronic Aquatic	Human Health	Water Background	Water Threshold	Water Benchmark
Metals											
Lead	0.0035	0.03	0.0041	0.0063	0.0078	0.1604	0.0336	NA	<0.002	0.0167	0.3182
Nickel	**0.011**	**0.0097**	**0.0078**	**0.011**	**0.011**	0.1163	0.007	NA	<0.02	0.1336	1.2028
Zinc	**0.16**	0.085	0.045	0.11	0.12	0.1723	0.1579	NA	0.012	0.3039	0.3014
PAHs											
Chrysene	0.00005	0.00012	0.00005	0.00005	0.00005	NA	NA	NA	NA	0.0036	0.0176
Fluoranthene	0.0001	0.0024	0.0001	0.0001	0.0001	NA	NA	NA	NA	0.0044	0.199
Pyrene	0.0001	0.0002	0.0001	0.0001	0.0001	NA	NA	NA	NA	0.0003	0.0876

Bold = exceedance of WQS
= exceedance of COSR threshold
= exceedance of COSR benchmark
ND = not detected
NA = not available

Table 7: 2007 17-acre Southwest Parcel Soil Sampling - TTEMI

Parameter	NS-SB01-0003	NS-SB01-0310	NS-SB02-0003	NS-SB02-0310	NS-SB03-0003	NS-SB03-0310	NS-SB03-1013	NS-SB03-1320	NS-SB03-1320D	NS-SB04-0003	NS-SB04-0310	NS-SB04-1013	NS-SB04-13-20	NS-SB05-0003	NS-SB05-0310	NS-SB05-1013	NS-SB05-1320	NS-SB06-0003	NS-SB06-0310	NS-SB07-0003	NS-SB07-0310	NS-SB08-0003	NS-SB08-0310	NS-SB09-0003	NS-SB09-0310	NS-SB09-0310D	NS-SB10-0003	NS-SB10-0310	NS-SB10-0310D	NS-SB11-0003	NS-SB11-0310	NS-SB12-0003	NS-SB12-0310	NS-SB12-0310D	NS-SB13-0003	NS-SB13-0310	NS-SB14-0003	NS-SB14-0310	NS-SB15-0003	NS-SB15-0310	IEPA Residential	Calumet Open Space Reserve Soil Background	Soil Threshold	Soil Benchmark
	0 - 3 ft	3 - 10 ft	0 - 3 ft	3 - 10 ft	0 - 3 ft	3 - 10 ft	10 - 13 ft	13 - 20 ft	13 - 20 ft	0 - 3 ft	3 - 10 ft	10 - 13 ft	13 - 20 ft	0 - 3 ft	3 - 10 ft	10 - 13 ft	13 - 20 ft	0 - 3 ft	3 - 10 ft	0 - 3 ft	3 - 10 ft	0 - 3 ft	3 - 10 ft	0 - 3 ft	3 - 10 ft	3 - 10 ft	0 - 3 ft	3 - 10 ft	3 - 10 ft	0 - 3 ft	3 - 10 ft	0 - 3 ft	3 - 10 ft	3 - 10 ft	0 - 3 ft	3 - 10 ft	0 - 3 ft	3 - 10 ft	0 - 3 ft	3 - 10 ft				
Metals																																												
Aluminum	9700	12000	10000	8400	8200	9000	5700	8000	7100	8300	5100	3000	4500	7000	5600	2800	5600	9600	2700	8400	1700	6800	3400	5800	3500	3500	9100	5600	8700	8200	4500	6800	2000	2000	9600	7600	5600	5200	6700	3700	78,000	9500	ND	ND
Arsenic	7.6	7	7.5	8.3	11	8.5	5.8	7.4	6.9	11	7.3	4.4	6.6	8.8	10	3.5	4.1	8.9	2.6	8	2.7	**14**	3.2	11	2.4	2.6	7.5	5.4	4.8	**16**	2.2	3.4	3.1	3.1	7	4.6	9.9	4.2	9.2	2.6	13	13	18	31
Barium	43	54	36	36	38	56	36	55	47	40	29	22	32	36	40	17	35	49	13	65	6	66	26	20	21	22	63	29	60	410	32	51	8.2	11	55	43	36	39	51	30	5,500	110	330	585
Beryllium	1.2	1.3	1.1	<1.2	1.2	<1.2	<1.3	<1.2	<1.3	1.2	<1.1	<1.2	<1.3	<1.1	<1.1	<1.3	<1.3	1.1	<1.1	1.4	<1.2	1.2	<1.2	1	<1.2	<1.3	0.62	<0.67	<0.59	0.71	<0.63	<0.68	<0.64	<0.63	0.57	<0.63	<0.53	<0.59	0.6	<0.63	160	0.59	21	48
Cadmium	<0.57	<0.61	<0.56	<0.6	<0.57	<0.58	<0.64	<0.61	<0.63	<0.55	<0.56	<0.58	<0.63	<0.56	<0.58	<0.62	<0.64	<0.55	<0.58	0.84	<0.59	0.98	<0.58	<0.51	<0.59	<0.65	<0.56	<0.67	<0.59	3.2	<0.63	<0.68	<0.64	<0.63	<0.55	<0.63	<0.53	<0.59	0.6	<0.63	78	0.6	0.4	3.37
Chromium	20	21	19	15	19	17	12	17	15	18	10	6.7	10	13	12	6.6	11	18	5.9	29	4.1	21	7.2	13	7.2	8.3	19	12	17	60	9.9	13	4.8	5.7	22	16	12	10	21	8.8	230/1710*	16.2	26	131
Cobalt	8.9	11	11	10	12	11	8.1	9.6	9.3	14	5.6	4.8	7.9	9.9	12	5	6.5	11	3.7	8	3.2	13	4.1	13	4.2	5.2	13	5.5	12	7.3	4.3	6	3.7	3.9	11	7.2	10	5.7	12	5.7	4,700	8.9	13	102
Copper	24	23	26	24	42	22	13	19	17	30	18	8.3	14	21	21	6.2	11	23	5.8	38	<2.9	60	9.1	25	6.5	9.6	23	19	16	330	9.9	14	3.8	6	20	19	26	13	31	8.1	2,900	19.6	54	190
Lead	42	31	20	19	59	16	15	27	18	22	16	10	20	20	20	7.9	9.2	24	8.8	160	4.9	1300	14	20	8.4	9.3	24	12	11	2700	15	16	9.5	18	26	17	52	13	130	17	400/1169*	36	16	430
Magnesium	21000	18000	25000	26000	23000	29000	19000	25000	23000	26000	8700	17000	21000	16000	12000	37000	34000	21000	25000	11000	29000	20000	20000	13000	19000	22000	23000	26000	24000	6600	13000	7800	28000	28000	25000	30000	8700	17000	16000	20000	325,000	4820	ND	ND
Manganese	300	520	360	360	380	420	290	400	250	410	150	230	330	360	490	410	430	380	250	680	260	480	230	410	200	220	520	240	400	440	150	120	260	250	530	400	350	230	700	240	1,600	636	152	500
Mercury	0.043	<0.032	<0.03	<0.03	0.06	<0.029	<0.032	0.1	<0.031	<0.028	<0.029	<0.03	0.055	0.029	<0.028	<0.029	<0.032	<0.028	<0.029	0.2	<0.029	**60**	<0.031	<0.027	<0.031	<0.032	<0.027	<0.031	<0.03	1.4	0.49	<0.032	0.041	<0.03	<0.028	<0.032	0.094	<0.029	0.052	<0.031	10	0.06	0.07	1.3
Nickel	27	30	30	25	33	28	19	25	23	35	17	11	16	21	23	10	16	29	8	24	5.2	31	10	26	9.1	10	31	16	27	56	10	15	6.2	6.7	26	19	21	12	25	11	1,600	18	44	210
Vanadium	21	24	21	18	18	20	14	19	17	20	21	8.8	112	20	19	10	15	23	11	22	6.7	20	13	20	12	15	22	17	20	19	16	17	7.8	8.3	22	19	25	18	23	13	550.0	25.2	8	43
Zinc	7.4	7.4	7.5	7.5	7.3	7.9	7.5	7.4	7.4	7.2	7.5	30	58	42	54	35	38	60	28	180	19	200	55	58	34	30	63	36	44	940	35	42	21	34	59	57	52	36	120	42	23,000	95	113	250
Pesticides																																												
DDD	0.0023	<0.0021	0.0027	0.0029	0.0027	<0.002	<0.0021	<0.002	<0.0021	<0.0018	<0.0019	<0.002	<0.002	<0.0018	<0.0018	<0.002	<0.002	<0.0018	<0.0019	0.0075	<0.0019	0.0019	0.037	<0.0017	<0.002	<0.0021	0.068	<0.0021	<0.002	0.034	<0.002	<0.022	<0.0021	<0.002	0.011	<0.0021	<0.0018	0.0084	0.0046	<0.0021	3	ND	0.004	0.04
DDE	0.0019	<0.0021	0.0055	<0.002	<0.0019	<0.002	<0.0021	<0.002	<0.0021	<0.0018	<0.0019	<0.002	<0.002	<0.0018	<0.0018	<0.002	<0.002	<0.0018	<0.0019	0.0079	<0.0019	0.0019	0.0024	<0.0017	<0.002	<0.0021	0.021	<0.0021	<0.002	0.011	<0.002	<0.022	<0.0021	<0.002	0.0061	0.002	<0.0018	0.002	0.026	<0.0021	2	ND	0.004	0.04
DDT	0.0019	<0.0021	<0.0019	<0.002	<0.0019	<0.002	<0.0021	<0.002	<0.0021	<0.0018	<0.0019	<0.002	<0.002	<0.0018	<0.0018	<0.002	<0.002	<0.0018	<0.0019	0.073	<0.0019	0.0023	0.002	<0.0017	<0.002	<0.0021	0.029	<0.0021	<0.002	0.015	<0.002	<0.022	<0.0021	<0.002	0.008	<0.0019	<0.0018	<0.0019	0.043	<0.0021	2	ND	0.004	0.04
PAHs																																												
Acenaphthene	<0.026	<0.029	<0.027	<0.028	<0.026	<0.028	<0.03	0.076	0.058	<0.035	<0.035	<0.037	0.082	<0.026	<0.028	0.073	<0.029	<0.025	<0.027	0.056	<0.027	<0.034	<0.027	<0.024	<0.029	<0.03	<0.026	<0.03	<0.028	0.039	<0.028	<0.032	<0.029	<0.029	<0.026	<0.029	<0.025	<0.028	<0.026	<0.029	4700	0.09	4	20
Anthracene	<0.026	<0.029	<0.027	<0.028	<0.026	<0.028	0.058	0.44	0.27	<0.035	<0.035	0.089	0.23	0.031	<0.028	0.47	<0.029	<0.025	<0.027	0.14	<0.027	0.11	<0.027	<0.024	<0.029	<0.03	<0.026	<0.03	<0.028	0.16	<0.028	<0.032	<0.029	<0.029	<0.026	<0.029	0.053	<0.028	<0.026	<0.029	23000	0.25	11400	51000
Benzo(a)anthracene	0.041	<0.029	<0.027	<0.028	0.046	<0.028	0.14	1.2	0.56	0.035	<0.035	0.22	0.51	0.12	<0.028	1.6	0.05	0.03	<0.027	0.42	<0.027	0.4	<0.027	<0.024	<0.029	<0.03	<0.026	<0.03	<0.028	0.61	<0.028	<0.032	<0.029	<0.029	<0.026	<0.029	0.23	<0.028	0.078	<0.029	1.1	1.1	NA	NA
Benzo(a)pyrene	0.041	<0.029	<0.027	<0.028	0.032	<0.028	0.064	0.48	0.21	<0.035	<0.035	0.085	0.2	0.11	<0.028	0.58	0.04	<0.025	<0.027	0.39	<0.027	0.44	<0.027	<0.024	<0.029	<0.03	<0.026	<0.03	<0.028	0.7	<0.028	<0.032	<0.029	<0.029	<0.026	<0.029	0.28	<0.028	0.039	<0.029	1.3	1.3	11.3	113
Benzo(b)Fluoranthene	0.049	<0.029	<0.027	<0.028	0.039	<0.028	0.048	0.53	0.21	<0.035	<0.035	0.11	0.23	0.13	<0.028	0.61	<0.029	0.029	<0.027	0.38	<0.027	0.4	<0.027	<0.024	<0.029	<0.03	<0.026	<0.03	<0.028	0.81	<0.028	<0.032	<0.029	<0.029	<0.026	<0.029	0.27	<0.028	0.049	<0.029	1.5	1.5	1	10
Benzo(ghi)perylene	0.028	<0.029	<0.027	<0.028	<0.026	<0.028	<0.03	0.37	0.097	<0.035	<0.035	0.043	0.12	0.073	<0.028	0.35	<0.029	<0.025	<0.027	0.25	<0.027	0.47	<0.027	<0.024	<0.029	<0.03	<0.026	<0.03	<0.028	0.43	<0.028	<0.032	<0.029	<0.029	<0.026	<0.029	0.13	<0.028	0.034	<0.029	ND	0.68	NA	NA
Benzo(k)fluoranthene	0.034	<0.029	<0.027	<0.028	0.03	<0.028	0.042	0.099	0.14	<0.035	<0.035	0.056	0.1	0.096	<0.028	0.23	<0.029	<0.025	<0.027	0.34	<0.027	0.37	<0.027	<0.024	<0.029	<0.03	<0.026	<0.03	<0.028	0.42	<0.028	<0.032	<0.029	<0.029	<0.026	<0.029	0.17	<0.028	0.045	<0.029	9	0.99	1	10
Chrysene	0.056	<0.029	0.029	<0.028	0.063	<0.028	0.26	2.3	0.97	0.049	<0.035	0.39	0.87	0.13	<0.028	3.1	0.1	0.041	<0.027	0.44	<0.027	0.41	<0.027	<0.024	<0.029	<0.03	0.027	<0.03	<0.028	0.61	<0.028	<0.032	<0.029	<0.029	<0.026	<0.029	0.27	<0.028	0.093	<0.029	88	1.2	NA	NA
Dibenzo(ah)anthracene	<0.026	<0.029	<0.027	<0.028	<0.026	<0.028	<0.03	0.064	0.054	<0.035	<0.035	<0.037	0.062	0.031	<0.028	0.21	<0.029	<0.025	<0.027	0.11	<0.027	0.17	<0.027	<0.024	<0.029	<0.03	<0.026	<0.03	<0.028	0.13	<0.028	<0.032	<0.029	<0.029	<0.026	<0.029	0.077	<0.028	<0.026	<0.029	0.2	0.2	NA	NA
Fluoranthene	0.069	<0.029	<0.027	<0.028	0.066	<0.028	0.22	1.2	0.75	0.077	<0.035	0.29	0.61	0.21	<0.028	1.6	0.059	0.051	<0.027	0.89	<0.027	0.77	<0.027	<0.024	<0.029	<0.03	0.039	<0.03	<0.028	1	<0.028	<0.032	<0.029	0.044	<0.026	<0.029	0.45	<0.028	0.13	<0.029	3100	2.7	NA	NA
Fluorene	<0.026	<0.029	<0.027	<0.028	<0.026	<0.028	0.039	0.2	0.23	<0.035	<0.035	0.052	0.2	<0.026	<0.028	0.32	<0.029	<0.025	<0.027	0.056	<0.027	<0.034	<0.027	<0.024	<0.029	<0.03	<0.026	<0.03	<0.028	0.054	<0.028	<0.032	<0.029	<0.029	<0.026	<0.029	<0.025	<0.028	<0.026	<0.029	3100	0.1	6	30
Indeno(123-cd)pyrenene	<0.026	<0.029	<0.027	<0.028	<0.026	<0.028	<0.03	0.061	0.07	<0.035	<0.035	<0.037	0.082	0.072	<0.028	0.24	<0.029	<0.025	<0.027	0.26	<0.027	0.43	<0.027	<0.024	<0.029	<0.03	<0.026	<0.03	<0.028	0.46	<0.028	<0.032	<0.029	<0.029	<0.026	<0.029	0.14	<0.028	0.033	<0.029	0.9	0.86	1	10
Naphthalene	<0.026	<0.029	<0.027	<0.028	0.028	<0.028	<0.03	0.057	<0.038	<0.035	<0.035	<0.037	0.07	0.029	<0.028	<0.038	<0.029	<0.025	<0.027	0.056	<0.027	<0.034	<0.027	<0.024	<0.029	<0.03	<0.026	<0.03	<0.028	0.042	<0.028	<0.032	<0.029	<0.029	<0.026	<0.029	<0.025	<0.028	<0.026	<0.029	170	0.04	852	1700
Phenanthrene	0.052	<0.029	0.049	0.028	0.1	<0.028	0.27	5.3	2.8	0.12	0.039	0.27	2.4	0.16	<0.028	6.7	0.16	0.047	<0.027	0.64	<0.027	0.51	<0.027	<0.024	<0.029	<0.03	0.026	<0.03	<0.028	0.54	<0.028	<0.032	<0.029	0.03	<0.026	<0.029	0.3	<0.028	0.069	<0.029	ND	1.3	5	50
Pyrene	0.065	<0.029	0.029	<0.028	0.07	<0.028	0.32	2.3	1.3	0.063	<0.035	0.53	1.2	0.18	<0.028	4.5	0.11	0.057	<0.027	0.7	<0.027	0.62	<0.027	<0.024	<0.029	<0.03	0.035	<0.03	<0.028	0.82	<0.028	<0.032	0.031	0.036	<0.026	<0.029	0.4	<0.028	0.13	<0.029	2300	1.9	83	1350
SVOCs																																												
Pentacholorophenol	<0.026	<0.029	<0.027	<0.028	<0.026	<0.028	<0.03	<0.029	<0.038	<0.035	<0.035	<0.037	<0.039	<0.026	<0.028	<0.038	<0.029	<0.025	<0.027	<0.042	<0.027	<0.034	<0.027	<0.024	<0.029	<0.03	<0.026	<0.03	<0.028	0.038	<0.028	<0.032	<0.029	<0.029	<0.026	<0.029	<0.025	<0.028	<0.026	<0.029	2300			
TCLP Metals																																												
Arsenic	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	5	RCRA - Hazardous Waste Criteria		
Barium	0.4	0.4	0.11	0.67	0.1	0.4	0.46	0.69	0.62	0.056	0.34	0.42	0.51	0.32	0.55	0.43	0.55	1.3	0.52	0.21	0.079	0.66	0.35	0.21	0.3	0.33	0.93	0.23	0.25	0.9	0.27	0.24	0.11	0.099	0.53	0.38	0.3	0.3	0.48	0.23	100			
Cadmium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0061	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.022	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	1			
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	5			
Lead	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0054	<0.005	<0.005	<0.005	0.011	0.014	<0.005	0.021	0.0079	<0.005	<0.005	<0.005	<0.005	0.012	0.019	<0.005	<0.005	<0.005	0.0063	<0.005	<0.005	<0.005	0.3	<0.005	0.0051	0.011	0.0096	<0.005	<0.005	0.014	<0.005	0.009	<0.005	5			
Mercury	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	0.2			
Selenium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1			
Silver	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	5			

Bold = exceedance TACO Tier 1 or Tier 3 (lead and chromium)
= exceedance of COSR threshold
= exceedance of COSR benchmark
ND = not detected
NA = not available
* Upper value is the TACO Tier 3 site-specific human health risk remedial objective

Table 8: 2007 17-acre Southeast Parcel Groundwater Sampling - TTEMI

Parameter	NS-TMW05	NS-TMW03	TACO	
PAHs			**Class I**	**Class II**
Acenaphthene	0.00083	<0.002	0.42	2.1
Acenaphthylene	0.0002	<0.002	0.21	1.05
Anthracene	0.0024	<0.002	2.1	10.5
Benzo(a)anthracene	0.0073	0.00026	0.00013	0.00065
Benzo(a)pyrene	0.0026	<0.0002	0.0002	0.002
Benzo(b)fluoranthene	0.0026	<0.00018	0.00018	0.0009
Benzo(ghi)perylene	0.001	<0.0001	0.21	1.05
Benzo(k)fluoranthene	0.0013	<0.00017	0.00017	0.00085
Chrysene	0.015	<0.00044	0.0015	0.0075
Dibenzo(ah)anthacene	0.00081	<0.0001	0.0003	0.0015
Fluroanthene	0.0059	0.00029	0.28	1.4
Fluorene	0.0029	<0.0002	0.28	1.4
Indeno(123-cd)pyrene	0.00065	<0.0001	0.00043	0.00215
Naphthalene	<0.002	<0.0002	0.14	0.22
Phenanthrene	0.039	0.00045	0.21	1.05
Pyrene	0.019	0.00056	0.21	1.05
Metal				
Aluminum	620	28	3.5	5
Antimony	<0.015	<0.006	0.006	0.024
Arsenic	0.82	0.036	0.05	0.2
Barium	6.1	0.75	2	2
Beryllium	0.039	0.0031	0.004	0.5
Cadmium	0.04	0.002	0.005	0.05
Calcium	3800	470	NA	NA
Chromium	0.92	0.063	0.1	1
Coblat	0.69	0.04	1	1
Copper	1.4	0.071	0.65	0.65
Cyanide	<0.01	<0.01	0.2	0.6
Iron	1900	77	5	5
Lead	4.3	0.094	0.0075	0.1
Magnesium	1600	200	NA	NA
Manganese	43	1.6	0.15	10
Mercury	0.0079 J	<0.0075	0.002	0.01
Nickel	2	0.088	0.1	2
Potassium	59	14	NA	NA
Selenium	0.038	<0.004	0.05	0.05
Silver	<0.1	<0.004	0.05	NA
Sodium	31	34	NA	NA
Thallium	<0.1	<0.004	0.002	0.02
Vanadium	1.5	0.07	0.049	0.1
Zinc	8.2	0.26	5	10

= exceedance of Class I

= exceedance of Class II

ND = not detected

NA = not available

Table 9: 2006 MWRD Parcel Sampling (all units in mg/kg unless states otherwise) - TTEMI

Parameter	HM-S-19-01	HM-S-20-01	HM-S-20-01D	HM-S-21-01	HM-S-22-01	HM-S-23-01	IEPA TACO		Calumet Open Space Reserve		
	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	Residential	Class II Groundwater	Soil Background	Soil Threshold	Soil Benchmark
Metals											
Arsenic	11	12	11	12	12	12	13	NA	13	18	31
Barium	46	56	53	34	45	31	5,500	NA	110	330	585
Cadmium	0.89	0.87	0.86	< 0.56	0.65	0.64	78	NA	0.6	0.4	3.37
Chromium	19	23	22	18	20	16	230/1710*	NA	16.2	26	131
Lead	82	51	49	23	30	21	400/1169*	NA	36	16	430
Pesticides											
DDD	0.0064	< 0.0041	< 0.0038	< 0.0038	< 0.0041	< 0.0038	3	80	ND	0.004	0.04
DDT	0.0068	0.0062	0.0061	< 0.0038	< 0.0041	< 0.0038	2	160	ND	0.004	0.04
PAHs											
Benzo(a)anthracene	0.068	0.035	0.09	< 0.029	0.033	< 0.029	1.1	8	1.1	NA	NA
Benzo(b)flouranthene	0.094	0.049	0.12	< 0.029	0.052	<0.029	1.5	25	1.5	1	10
Benzo(k)fluoranthene	0.051	< 0.031	0.062	< 0.029	< 0.031	<0.029	9	250	0.99	1	10
Benzo(ghi)perylene	0.036	< 0.031	0.043	< 0.029	< 0.031	<0.029	ND	ND	0.68	NA	NA
Benzo(a)pyrene	0.064	0.032	0.077	< 0.029	< 0.031	< 0.029	1.3	82	1.3	11.3	113
Chrysene	0.086	0.037	0.099	0.034	0.058	< 0.029	88	800	1.2	NA	NA
Flouranthene	0.12	0.066	0.14	< 0.029	0.072	< 0.029	3100	21000	2.7	NA	NA
Indeno(123-cd)pyrenene	0.034	< 0.031	0.046	< 0.029	< 0.031	< 0.029	0.9	69	0.86	1	10
Naphthalene	0.089	< 0.031	< 0.03	< 0.029	< 0.031	< 0.029	170	18	0.04	852	1700
Phenanthrene	0.093	0.043	0.09	0.074	0.058	0.048	ND	ND	1.3	5	50
Pyrene	0.11	0.059	0.12	0.035	0.065	< 0.029	2300	21000	1.9	83	1350

Bold = exceedance TACO Tier 1 or Tier 3 (lead and chromium)

= exceedance of COSR threshold

= exceedance of COSR benchmark

ND = not detected

NA = not available

* Upper value is the TACO Tier 3 site-specific human health risk remedial objective

Table 10: 2006 100-acre Truss Storage Area Sampling (all units in mg/kg unless states otherwise) - TTEMI

Parameter	HM-S-24-34	HM-S-25-34	HM-S-25-34D	HM-S-26-34	HM-S-27-34	HM-S-28-34	HM-S-29-34	IEPA TACO Residential	IEPA TACO Class II Groundwater	Calumet Open Space Reserve Soil Background	Calumet Open Space Reserve Soil Threshold	Calumet Open Space Reserve Soil Benchmark
	3 - 4 ft	3 - 4 ft	3 - 4 ft	3 - 4 ft	3 - 4 ft	3 - 4 ft	3 - 4 ft					
Metals												
Arsenic	1.3	9.3	7.8	13	**15**	6.9	4	13	NA	13	18	31
Barium	7.8	100	130	29	23	79	23	5,500	NA	110	330	585
Cadmium	0.31	0.325	0.31	0.27	0.28	0.275	0.325	78	NA	0.6	0.4	3.37
Chromium	4.9	17	17	17	15	22	7.7	230/1710*	NA	16.2	26	131
Lead	5.2	150	110	20	21	15	6.7	400/1169*	NA	36	16	430
Mercury	0.0145	0.29	0.072	0.03	0.035	0.03	0.0155	10	NA	0.06	0.07	1.3
Selenium	0.6	0.65	0.6	0.55	0.55	0.55	0.65	390	NA	0.48	0.8	1
Silver	0.6	0.65	0.6	0.55	0.55	0.55	0.65	390	NA	0.55	0.4	2
Pesticides												
DDD	0.00205	0.29	0.41	0.0019	0.0185	0.00195	0.0021	3	80	ND	0.004	0.04
DDE	0.00205	0.04	0.036	0.0019	0.0185	0.00195	0.0021	2	270	ND	0.004	0.04
DDT	0.00205	0.63	0.81	0.0019	0.0185	0.00195	0.0021	2	160	ND	0.004	0.04
PAHs												
Acenaphthene	0.0155	0.0153	0.0152	0.014	0.0185	0.015	0.0152	4700	2900	0.09	4	20
Acenaphthylene	0.0155	0.0153	0.0152	0.014	0.0185	0.015	0.0152	ND	ND	0.03	ND	ND
Anthracene	0.0155	0.042	0.067	0.014	0.0185	0.015	0.0152	23000	59000	0.25	11400	51000
Benzo(a)anthracene	0.0155	0.15	0.23	0.014	0.0185	0.047	0.0152	1.1	8	1.1	ND	ND
Benzo(a)pyrene	0.0155	0.83	0.13	0.014	0.0185	0.063	0.0152	1.3	82	1.3	11.3	113
Benzo(b)Fluoranthene	0.0155	0.13	0.21	0.014	0.0185	0.054	0.0152	1.5	25	1.5	1	10
Benzo(ghi)perylene	0.0155	0.061	0.11	0.014	0.0185	0.034	0.0152	ND	ND	0.68	ND	ND
Benzo(k)fluoranthene	0.0155	0.06	0.082	0.014	0.0185	0.015	0.0152	9	250	0.99	1	10
Chrysene	0.0155	0.16	0.25	0.014	0.0185	0.061	0.0152	88	800	1.2	ND	ND
Dibenzo(ah)anthracene	0.0155	0.0153	0.035	0.014	0.0185	0.015	0.0152	0.2	7.6	0.2	ND	ND
Fluoranthene	0.0155	0.25	0.39	0.014	0.0185	0.048	0.0152	3100	21000	2.7	ND	ND
Fluorene	0.0155	0.0153	0.035	0.014	0.0185	0.015	0.0152	3100	2800	0.1	6	30
Indeno(123-cd)pyrenene	0.0155	0.062	0.11	0.014	0.0185	0.015	0.0152	0.9	69	0.86	1	10
Naphthalene	0.0155	0.13	0.22	0.014	0.0185	0.042	0.0152	170	18	0.04	852	1700
Phenanthrene	0.0155	0.2	0.3	0.08	0.23	0.045	0.0152	ND	ND	1.3	5	50
Pyrene	0.0155	0.22	0.32	0.014	0.0185	0.079	0.0152	2300	21000	1.9	83	1350
SVOCs												
4-Chloroaniline	0.11	0.11	0.09	0.1	0.095	0.1	0.11			ND	ND	ND
Bis(2-ethyl hexyl)phalate	0.11	0.11	0.09	0.1	0.095	0.1	0.11			ND	ND	ND
Metals												
Arsenic, TCLP	0.005	0.005	0.005	0.005	0.005	0.005	0.005	5	RCRA - TCLP Regulatory Limit			
Barium, TCLP	0.11	0.3	0.35	0.21	0.063	0.28	0.23	100				
Cadmium, TCLP	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	1				
Chromium, TCLP	0.005	0.005	0.005	0.005	0.005	0.005	0.005	5				
Lead, TCLP	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	5				
Mercury, TCLP	0.000125	0.000125	0.000125	0.000125	0.000125	0.000125	0.000125	0.2				
Selenium, TCLP	0.005	0.005	0.005	0.005	0.005	0.005	0.005	1				
Silver, TCLP	0.005	0.005	0.005	0.005	0.005	0.005	0.005	5				

Bold = exceedance TACO Tier 1 or Tier 3 (lead and chromium)
= exceedance of COSR threshold
= exceedance of COSR benchmark
ND = not detected
NA = not available
* Upper value is the TACO Tier 3 site-specific human health risk remedial objective

Table 11: 2006 Supplemental Hegewisch Marsh Sediment Sampling - TTEMI

Parameter	HM-SED-05	HM-SED-05D	HM-SED-06	HM-SED-07	HM-SED-08	IEPA Residential	Calumet Open Space Reserve Background	Calumet Open Space Reserve Sediment Threshold	Calumet Open Space Reserve Sediment Benchmark
Metals									
Cadmium	0.042 J	0.028 J	0.024 J	0.019 J	0.012 U	78	3.7	0.99	4.98
Copper	0.5	0.48	0.55	0.52	0.44	2,900	99.9	31.6	149
Lead	0.76 J	0.75 J	0.62 J	0.58 J	0.49 J	400/1169*	538	35.8	128
Mercury	0.0027 R	0.0025 R	0.0025 R	0.0021 R	0.0019 R	10	0.47	0.18	1.06
Nickel	0.22 J	0.21 J	0.2 J	0.2 J	0.18 J	1,600	49.2	22.7	48.6
Silver	0.012 UJ	0.011 UJ	0.011 UJ	0.0093 UJ	0.0091 J	390	0.64	1	3.7
Zinc	4.6 J	5 J	4.1 J	4.1 J	3.4 J	23,000	761	121	459

J = Estimated
UJ = Not detected/estimated
R = Rejected
U = not detected
* Upper value is the TACO Tier 3 site-specific human health risk remedial objective

Table 12: 2006 Remediation Area B - Hegewisch Marsh Soil Sampling -

Parameter	HM-S-SB-10A-02	HM-S-SB-10A-02D	HM-S-SB-10A-24	HM-S-SB-10B-02	HM-S-SB-10B-24	HM-S-SB-10C-02	HM-S-SB-10C-24	HM-S-SB10D-02	HM-S-SB-10D-24	HM-S-SB-10E-02	HM-S-SB-10E-24	IEPA	Calumet Open Space		
	0 - 2 ft	0 - 2 ft	2 - 4 ft	0 - 2 ft	2 - 4 ft	0 - 2 ft	2 - 4 ft	0 - 2 ft	2 - 4 ft	0 - 2 ft	2 - 4 ft	Residential	Soil Background	Soil Threshold	Soil Benchmark
Metals															
Arsenic	13	10	13	**19**	12	13	12	**14**	**14**	10	**14**	13	13	18	31
Barium	90	62	30	160	34	72	42	110	30	150	38	5,500	110	330	585
Cadmium	0.98	0.63	0.275	1.9	0.265	0.65	0.275	53	0.27	2	0.27	78	0.6	0.4	3.37
Chromium	22	24	18	25	19	22	20	21	21	21	19	230/1710*	16.2	26	131
Lead	220	35	24	940	21	220	21	460	23	770	20	400/1169*	36	16	430
Mercury	0.17	0.16	0.014	0.93	0.0135	0.26	0.013	0.47	0.0135	0.33	0.029	10	0.06	0.07	1.3
Selenium	0.55	0.55	0.55	3.3	0.55	0.55	0.55	1.2	0.55	0.6	0.55	390	0.48	0.8	1
Silver	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.6	0.55	390	0.55	0.4	2

Table 13: 2006 Remediation Area A - Hegewisch Marsh Soil Sampling -

Parameter	HM-S-16A-02	HM-S-16A-24	HM-S-16B-02	HM-S-16B-24	HM-S-16C-02	HM-S-16C-24	HM-S-16D-02	HM-S-16D-24	HM-S-16E-02	HM-S-16E-24	HM-S-16E-24D	IEPA	Calumet Open Space		
	0 - 2 ft	2 - 4 ft	0 - 2 ft	2 - 4 ft	0 - 2 ft	2 - 4 ft	0 - 2 ft	2 - 4 ft	0 - 2 ft	2 - 4 ft	2 - 4 ft	Residential	Soil Background	Soil Threshold	Soil Benchmark
Metals															
Arsenic	10	8.9	**17**	**46**	**17**	4.6	13	**14**	**22**	9	6.6	13	13	18	31
Barium	88	77	95	160	37	52	39	31	100	66	69	5,500	110	330	585
Cadmium	0.275	0.304	1.4	2.2	0.265	0.275	0.275	0.27	0.97	0.3	0.305	78	0.6	0.4	3.37
Chromium	32	260	70	130	19	17	18	17	72	20	17	230/1710*	16.2	26	131
Lead	**37000**	170	**86000**	**18000**	26	13	27	23	**22000**	21	25	400/1169*	36	16	430
Mercury	0.23	0.033	0.23	0.37	0.036	0.014	0.0135	0.037	0.058	0.037	0.04	10	0.06	0.07	1.3
Selenium	0.55	0.53	0.55	1.1	0.55	0.55	0.55	0.55	0.5	0.6	0.6	390	0.48	0.8	1
Silver	0.55	0.53	0.55	1.1	0.55	0.55	0.55	0.55	0.5	0.6	0.6	390	0.55	0.4	2

Table 14: 2006 Remediation Area C - Hegewisch Marsh Soil Sampling -

Parameter	HM-S-18A-02	HM-S-18A-24	HM-S-18B-02	HM-S-18B-24	HM-S-18C-02	HM-S-18C-02D	HM-S-18C-24	HM-S-18D-02	HM-S-18D-24	HM-S-18E-02	HM-S-18E-24	IEPA	Calumet Open Space		
	0 - 2 ft	2 - 4 ft	0 - 2 ft	2 - 4 ft	0 - 2 ft	0 - 2 ft	2 - 4 ft	0 - 2 ft	2 - 4 ft	0 - 2 ft	2 - 4 ft	Residential	Soil Background	Soil Threshold	Soil Benchmark
Metals															
Arsenic	9.6	9.8	9.5	5.6	8	12	**39**	6	9	16	10	13	13	18	31
Barium	82	57	45	46	68	71	45	62	65	130	69	5,500	110	330	585
Cadmium	0.27	0.29	0.27	0.275	0.27	0.28	1.2	0.275	0.27	1.4	0.285	78	0.6	0.4	3.37
Chromium	27	17	20	22	23	22	210	21	23	41	18	230/1710*	16.2	26	131
Lead	27	29	59	14	50	72	900	13	17	450	29	400/1169*	36	16	430
Mercury	0.036	0.014	0.042	0.0145	0.14	0.075	0.081	0.0145	0.0134	0.068	0.03	10	0.06	0.07	1.3
Selenium	0.55	0.6	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	390	0.48	0.8	1
Silver	0.55	0.6	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	390	0.55	0.4	2

Bold = exceedance TACO Tier 1 or Tier 3 (lead and chromium)
= exceedance of COSR threshold
= exceedance of COSR benchmark
ND = not detected
NA = not available
* Upper value is the TACO Tier 3 site-specific human health risk remedial objective

Table 15: 2007 Remediation Area B - Hegewisch Marsh Soil Sampling - TTEMI

Parameter	HM-S-SB-10B2-02	HM-S-SB-10B3-02	HM-S-SB-10B4-02	HM-S-SB-10B5-02	HM-S-SB-10B6-02	HM-S-SB-10D1-02	HM-S-SB-10D3-02	HM-S-SB-10D2-02	HM-S-SB-10D3-02D	HM-S-SB-10D4-02	HM-S-SB-10E1-02	HM-S-SB-10E2-02	HM-S-SB-10E3-24	HM-S-SB-10E5-02	HM-S-SB-10E6-24	HM-S-SB-10E7-24	HM-S-SB-10E8-02	HM-S-SB-10E9-02	IEPA TACO	Calumet Open Space Reserve		
	0 - 2 ft	0 - 2 ft	0 - 2 ft	2 - 4 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	2 - 4 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	2 - 4 ft	0 - 2 ft	2 - 4 ft	2 - 4 ft	0 - 2 ft	0 - 2 ft	Residential	Soil Background	Soil Threshold	Soil Benchmark
Metals																						
Arsenic	**18**	13	6.8	12	11	11	13	11	10	**16**	9.5	**28**	**14**	**16**	9.7	7.8	**19**	12	13	13	18	31
Cadmium	4.1	1.1	0.78	0.75	1.8	1.2	2.1	0.69	1.6	2	1	1.7	<0.53	5.9	<0.56	<0.52	0.89	0.68	78	0.6	0.04	3.37
Chromium	21	16	12	28	14	12	34	22	29	21	27	250	19	79	23	19	28	85	230/1710*	16.2	26	131
Copper	420	140	250	69	170	54	200	200	230	410	220	190	33	210	21	32	180	140	2,900	19.6	54	190
Lead	900	630	480	190	430	240	680	300	580	990	390	440	20	550	14	260	540	170	400/1169*	36	16	430
Mercury	1.5	0.27	0.31	0.42	0.57	0.32	0.39	0.36	0.41	0.5	0.13	0.4	<0.03	0.31	<0.03	<0.03	0.17	0.063	10	0.06	0.07	1.3
Selenium	1.8	1.2	<1.2	<1.2	<1.1	<1.2	<1.2	<1.2	<1.2	1.4	<1.2	<1.1	<1.1	2	<1.1	<1	<1.2	<1.1	390	0.48	0.8	1
Silver	<1.3	<1.2	2	<1.2	<1.1	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.1	<1.1	<1.3	<1.1	<1	<1.2	<1.1	390	0.55	0.4	2
Zinc	1200	380	360	200	360	230	640	360	430	660	300	380	69	13000	44	150	360	180	23,000	95	113	250

Table 16: 2007 Remediation Area A - Hegewisch Marsh Soil Sampling - TTEMI

Parameter	HM-S-16A1-68	HM-S-16A5-68	HM-S-16A6-24	HM-S-16B3-24	HM-S-16B8-0812	HM-S-16B9-1214	HM-S-16C1-24D	HM-S-16C2-02	HM-S-16D3-24	HM-S-16D4-02	HM-S-16E4-02	HM-S-16F5-24	HM-S-16F6-02	IEPA TACO	Calumet Open Space Reserve		
	6 - 8 ft	6 - 8 ft	2 - 4 ft	2 - 4 ft	8 - 12 ft	12 - 14 ft	2 - 4ft	0 - 2 ft	2 - 4 ft	0 - 2 ft	0 - 2 ft	2 - 4 ft	0 - 2 ft	Residential	Soil Background	Soil Threshold	Soil Benchmark
Metals																	
Arsenic	**42**	7.6	7.3	**15**	**42**	3	12	13	**15**	13	7.1	9.1	10	13	13	18	31
Chromium	150	180	80	100	110	6.4	14	40	43	27	46	16	18	230/1710*	16.2	26	131
Copper	75	46	61	92	320	3.8	33	73	59	43	27	22	27	2,900	19.6	54	190
Lead	270	69	76	**33000**	360	44	21	**4200**	150	**1800**	58	26	56	400/1169*	36	16	430
Mercury	0.084	0.64	0.67	0.44	0.037	<0.03	<0.03	0.1	0.23	0.1	0.057	0.043	0.082	10	0.06	0.07	1.3
Selenium	<1.1	1.4	<1	<1.1	<1.1	<1.2	<1	<1.1	<1.1	<1.1	<1.1	<1.2	<1.1	390	0.48	0.8	1
Thallium	<1.1	<1.2	<1	5.6	<1.1	<1.2	1.3	1.5	<1.1	1.3	<1.1	<1.2	<1.1	6	0.32	0.86	1.3
Zinc	250	150	190	540	560	26	46	390	260	160	96	66	92	23,000	95	113	250

Bold = exceedance TACO Tier 1 or Tier 3 (lead and chromium)

= exceedance of COSR threshold

= exceedance of COSR benchmark or RCRA TCLP

ND = not detected

NA = not available

* Upper value is the TACO Tier 3 site-specific human health risk remedial objective

Table 17: 2007 Remediation Area C - Hegewisch Marsh Soil Sampling - TTEMI

Parameter	HM-S-18D1-02	HM-S-18D1-02D	HM-S-18D2-02	HM-S-18D3-02	HM-S-18E1-02	HM-S-18E4-02	HM-S-18E25-02	HM-S-18E24-24	HM-S-18E8-02	HM-S-18-road comp	IEPA TACO Residential	Calumet Open Space Reserve Soil Background	Calumet Open Space Reserve Soil Threshold	Calumet Open Space Reserve Soil Benchmark
	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	2 - 4 ft	0 - 2 ft					
Metals														
Antimony	<2.2	<2.3	<2.3	24	27	21	<2.2	<2.3	<2.3	**920**	31	4	0.3	65
Arsenic	11	8.1	9.9	5.3	8.6	8.9	9.7	6.2	8.7	**15**	13	13	18	31
Chromium	26	20	19	23	170	29	31	17	31	92	230/1710*	16.2	26	131
Copper	30	30	52	1300	1300	640	61	18	320	**92000**	2,900	19.6	54	190
Lead	43	51	150	600	630	570	99	12	87	**27000**	400/1169*	36	16	430
Mercury	0.048	0.031	0.16	0.095	0.07	0.06	0.054	<0.029	0.057	0.81	10	0.06	0.07	1.3
Selenium	<1.1	<1.1	<1.1	<1.2	<1.1	<1.5	<1.1	<1.1	<1.2	7.3	390	0.48	0.8	1
Silver	<1.1	<1.1	<1.1	<1.2	<1.1	<1.5	<1.1	<1.1	<1.2	4.9	390	0.55	0.4	2
Zinc	82	97	130	410	620	440	180	44	130	16000	23,000	95	113	250

Table 18: 2007 Remediation Area - Hegewisch Marsh TCLP Soil Sampling - TTEMI

Parameter	HM-S-SB-10E3-02	HM-S-SB-10E6-02	HM-S-16A1-02	HM-S-16A1-68	HM-S-16B-02	HM-S-16B3-02	HM-S-16B9-0812	HM-S-16C1-24	HM-S-16D3-02	HM-S-16F5-02	HM-S-18-Road Comp	RCRA TCLP Regulatory Limit
							0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	
Metals												
Arsenic, TCLP	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.04	5
Barium, TCLP	0.52	0.49	0.61	0.37	0.28	0.61	0.84	0.16	0.8	0.47	0.87	100
Cadmium, TCLP	<0.01	<0.01	<0.01	<0.01	0.0055	0.017	<0.01	<0.01	0.021	<0.01	0.22	1
Chromium, TCLP	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.04	5
Lead, TCLP	0.096	0.69	120	0.047	50	240	0.4	0.025	74	2.9	57	5
Mercury, TCLP	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	0.2
Selenium, TCLP	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.04	1
Silver, TCLP	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.04	5

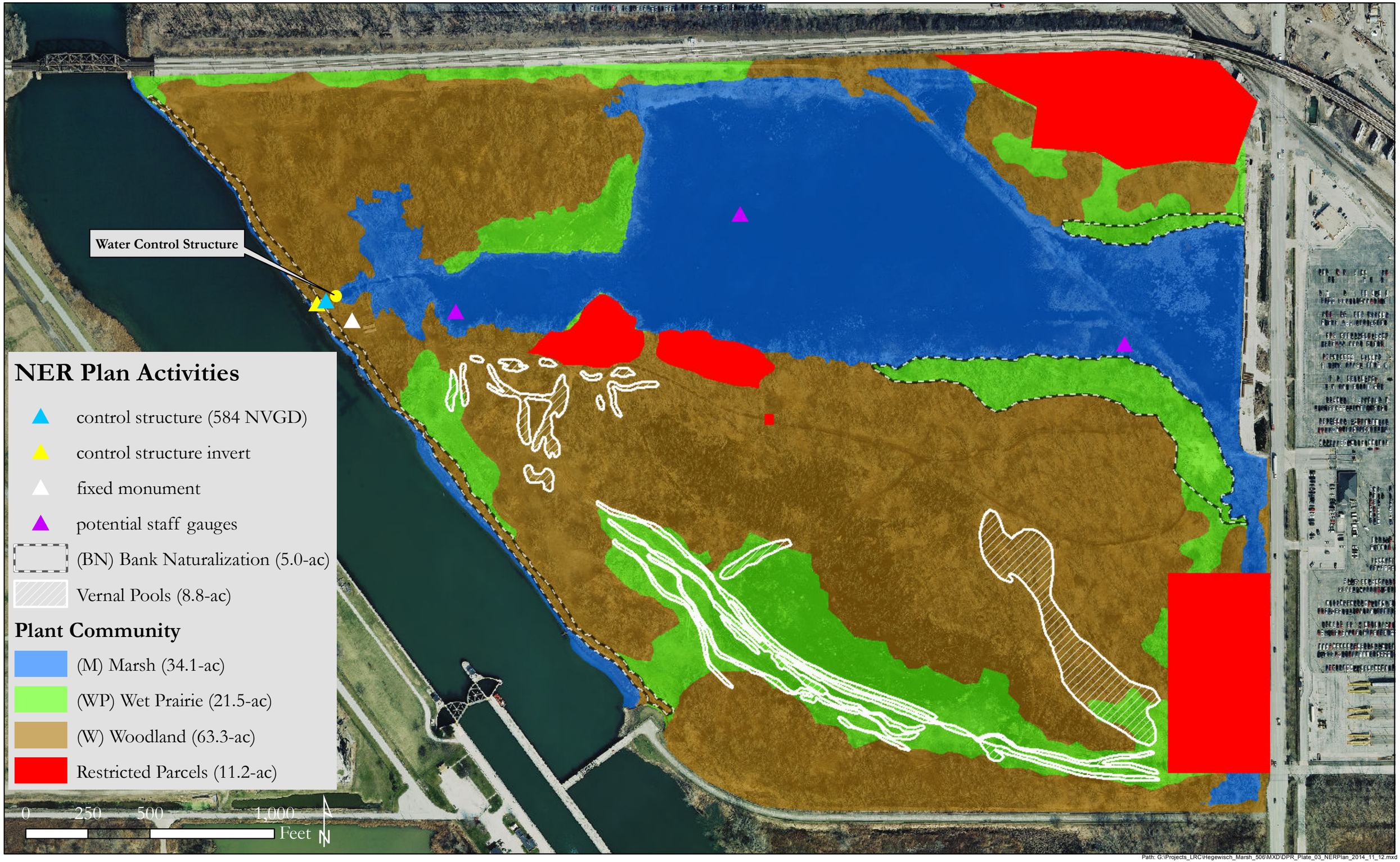
Bold = exceedance TACO Tier 1 or Tier 3 (lead and chromium)
= exceedance of COSR threshold
= exceedance of COSR benchmark or RCRA TCLP
ND = not detected
NA = not available
* Upper value is the TACO Tier 3 site-specific human health risk remedial objective

Figure 1: Project Location Map

Figure 2: Hegewisch Marsh Natural Area

Figure 3: National Ecosystem Restoration (NER) Plan

U.S. Army Corps of Engineers
Chicago District



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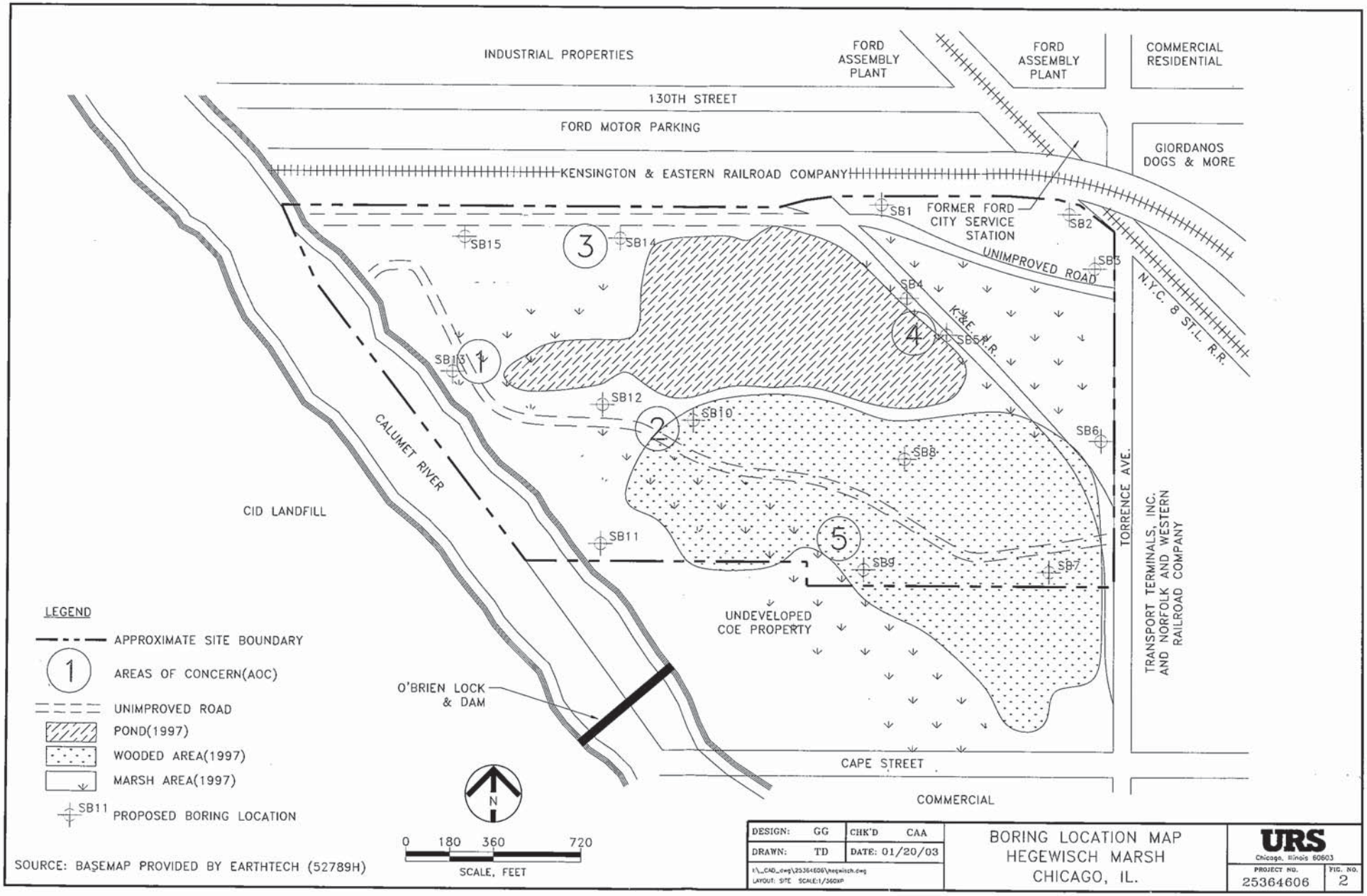
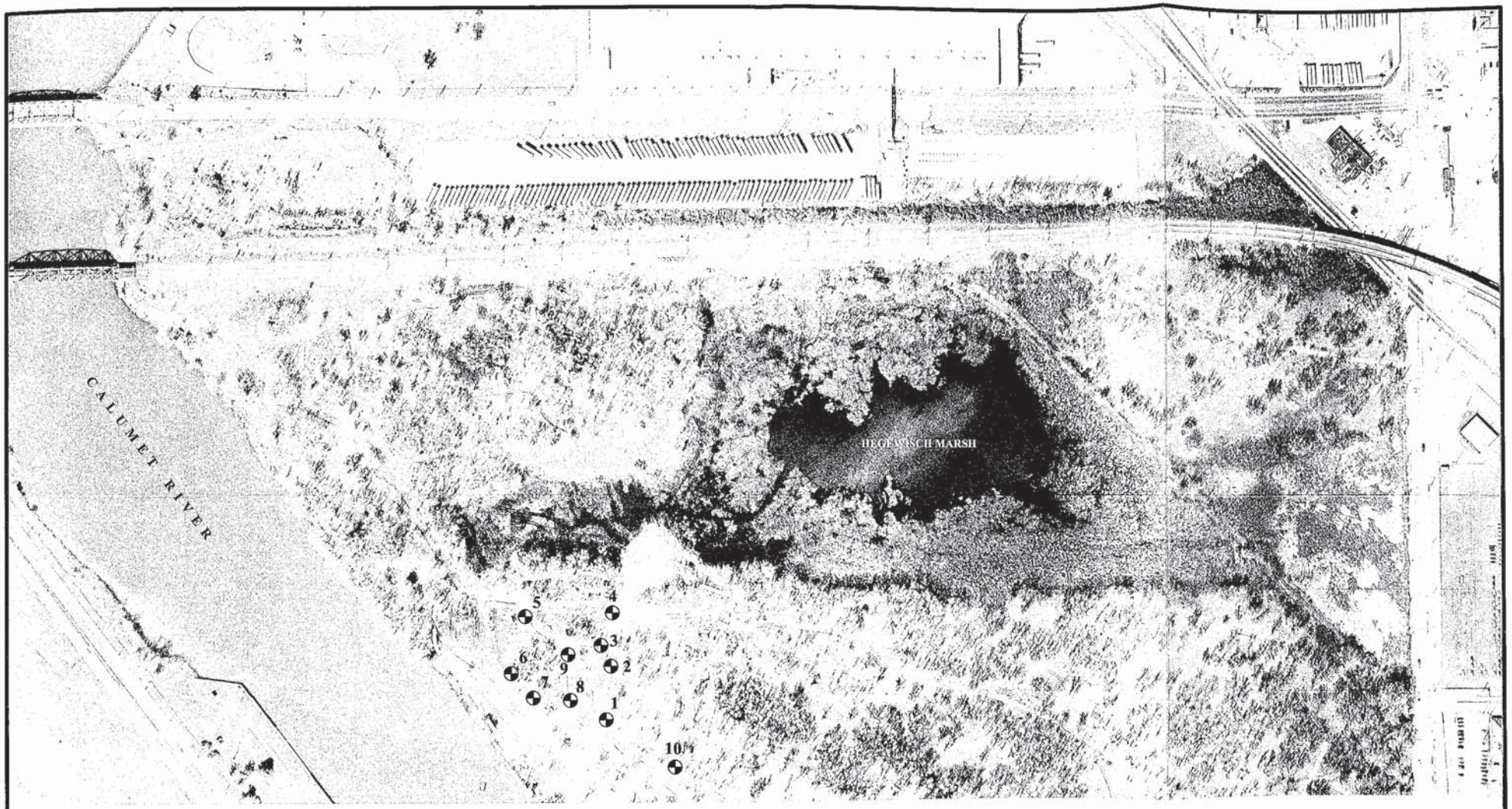


Figure 4 - URS 2002 Phase II Sample Locations



LEGEND

PROPOSED WETLAND MITIGATION SITE

5 SOIL BORING LOCATION

0 125 250

SCALE IN FEET

CITY OF CHICAGO
DEPARTMENT OF ENVIRONMENT
130TH STREET AND TORRENCE AVENUE

FIGURE 1-2
SOIL BORING LOCATION MAP

Tetra Tech EM Inc.

Figure 5 - 2003 Mitigation Site Sample Locations

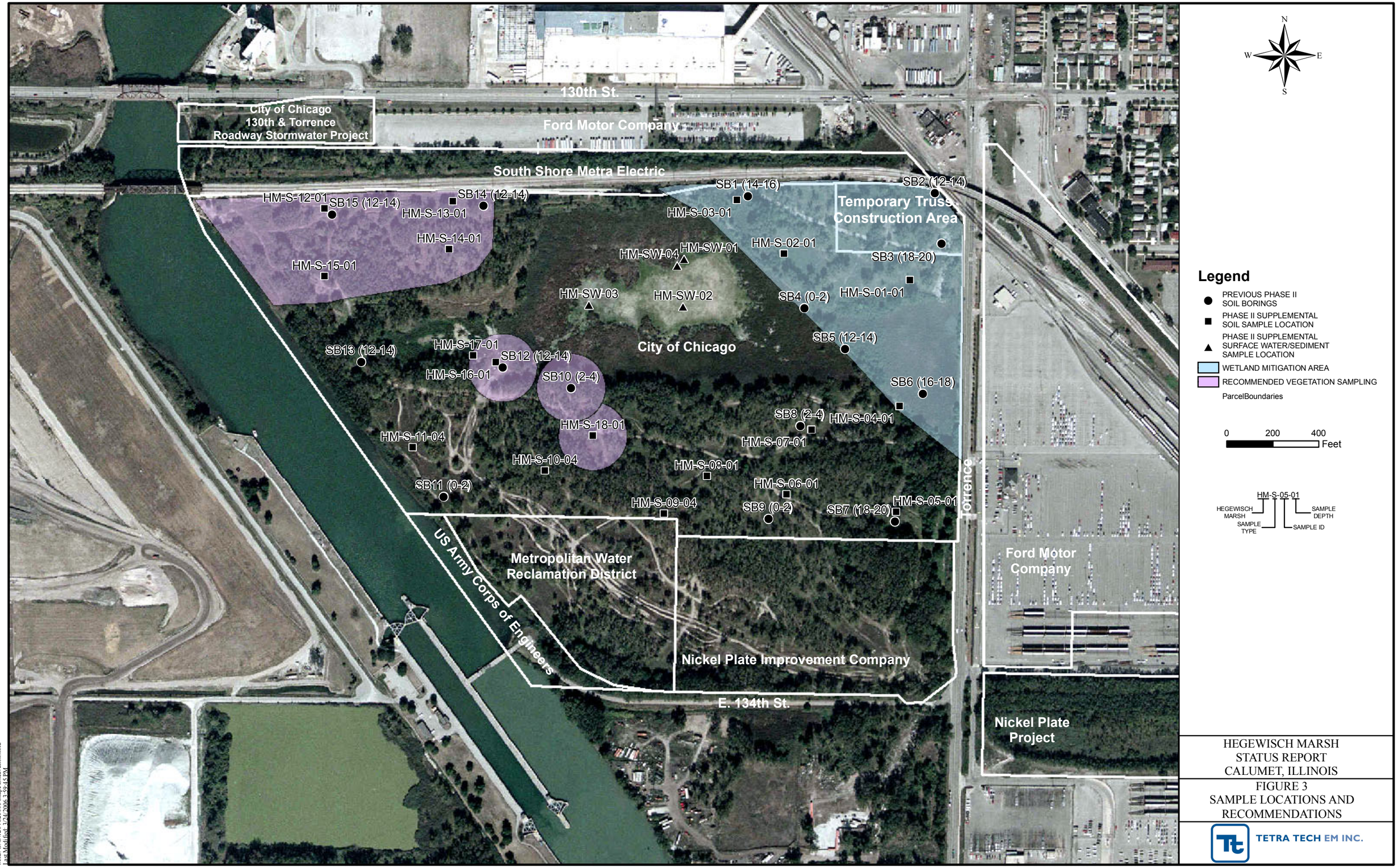


Figure 6 - Hegewisch Marsh 2006 Initial Sample Locations

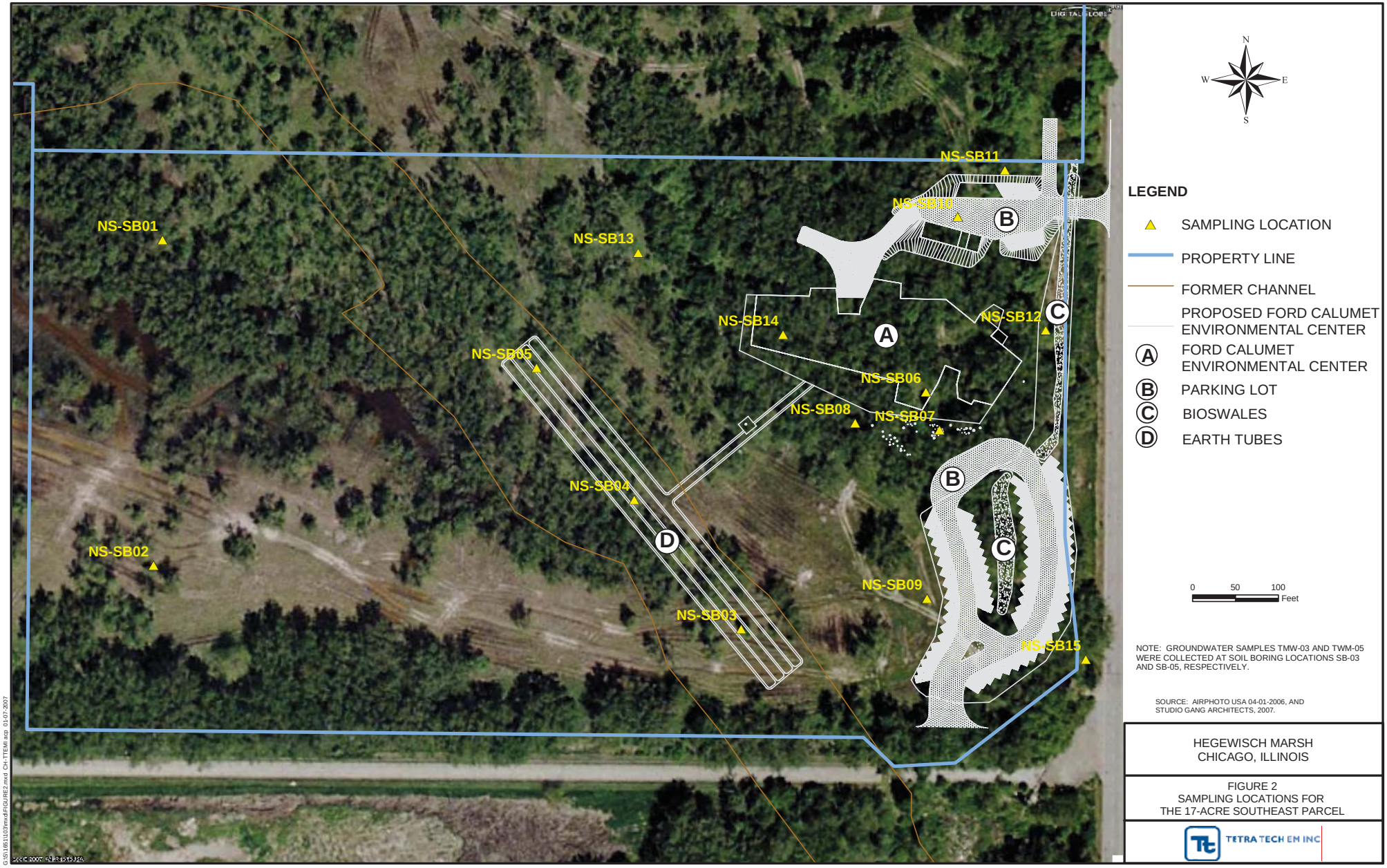


Figure 7 - 2007 17-acre Norfolk-Southern Sample Locations

N
W E
S

Legend

PARCEL BOUNDARIES

SURFACE SOIL
SAMPLE LOCATIONS

0 200 400
Feet

Note:

* A GPS point was not available for this sample location; therefore, it is approximate.

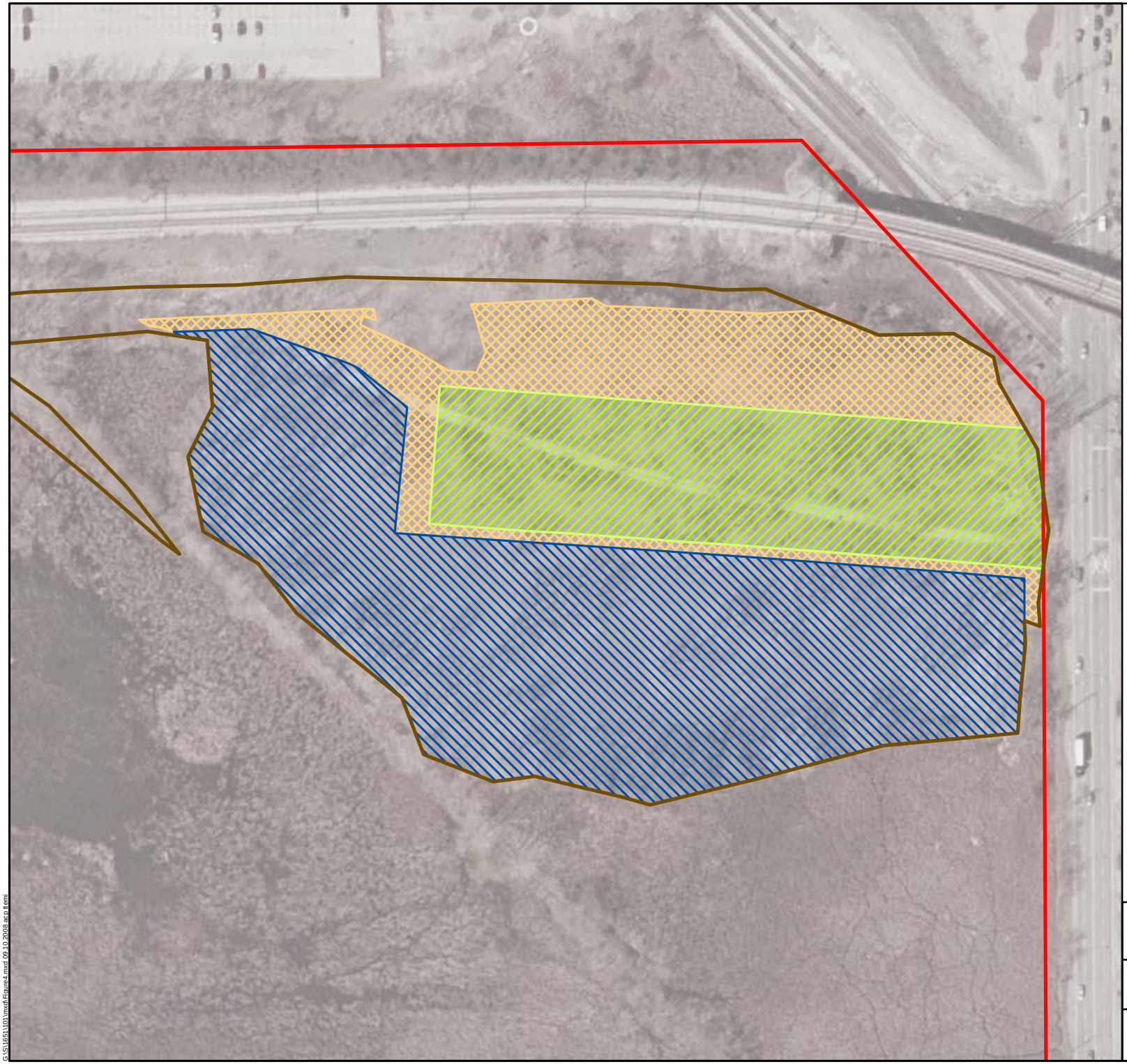
HEGEWISCH MARSH
STATUS REPORT
CHICAGO, ILLINOIS

FIGURE 1
SAMPLE LOCATIONS -
MWRD PARCEL

TETRA TECH EM INC.

Mxd: G:\S1204\025005\mxd\Fig1mwaalpoints.mxd
Last Modified: 9/6/2006 9:45:34 AM

Figure 8 - MWRD 2006 Sample Locations



N
W E
S

LEGEND

UPLAND BOUNDARY

BOUNDARY

WETLAND MITIGATION

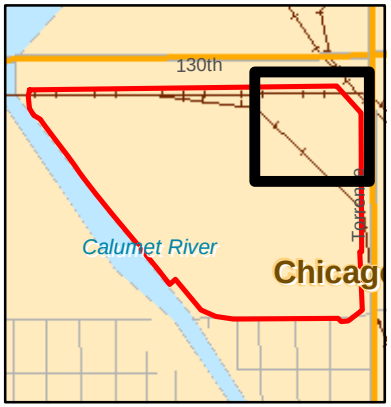
UPLAND FOR SOIL STOCKPILE

TRUSS AREA

WETLAND CREATION

NOTE:
WETLAND MITIGATION AREA:

UPLAND FOR SOIL STOCKPILE	1.90 ACRE
TRUSS AREA	2.25 ACRE
WETLAND CREATION	4.58 ACRE



0 60 120 Feet

SOURCE: AERIAL FROM ILLINOIS GEOSPATIAL DATABASE 2007.

HEGEWISCH MARSH- 17-ACRE PARCEL
134TH AND TORRENCE AVE
CHICAGO, IL

FIGURE 4
PROPOSED WETLAND MITIGATION PLAN

TETRA TECH EM INC.

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Figure 9 - FCEC Mitigation Plan

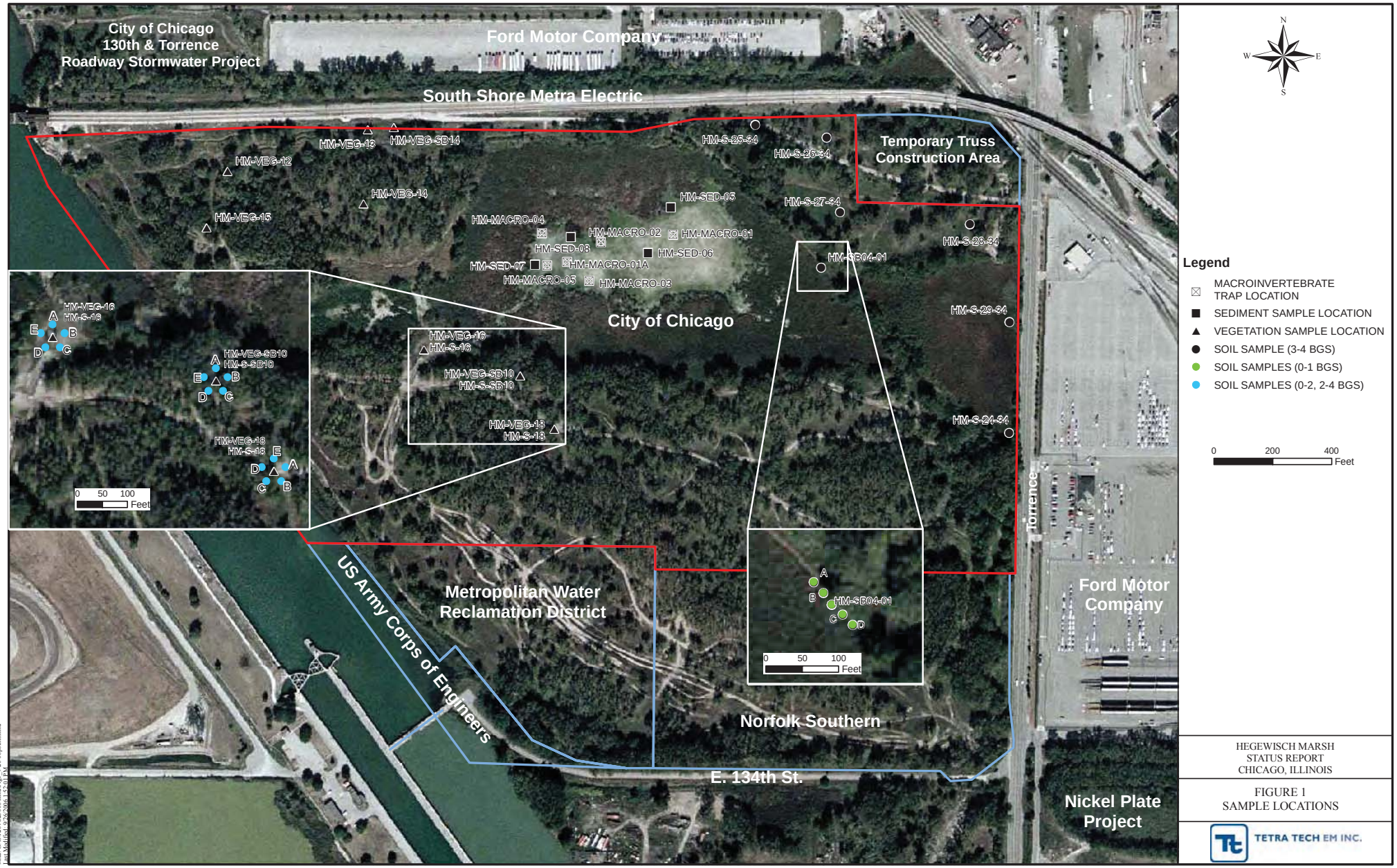
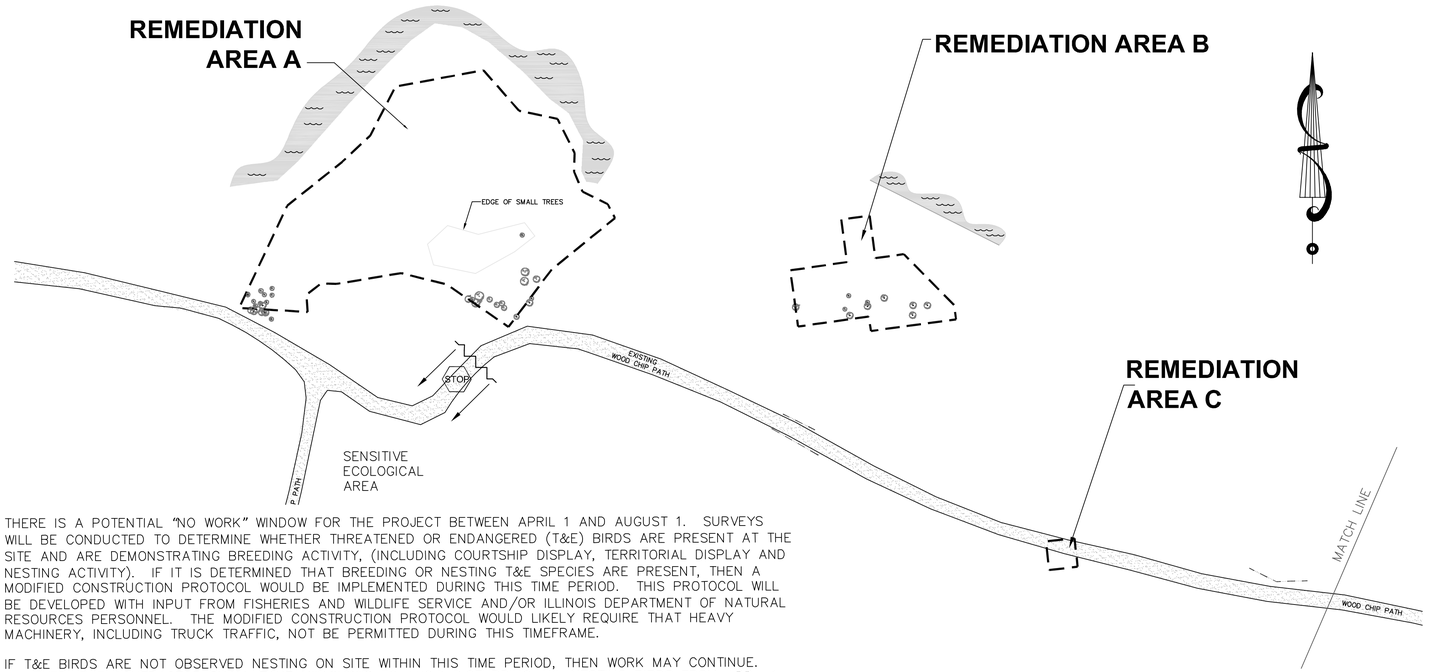
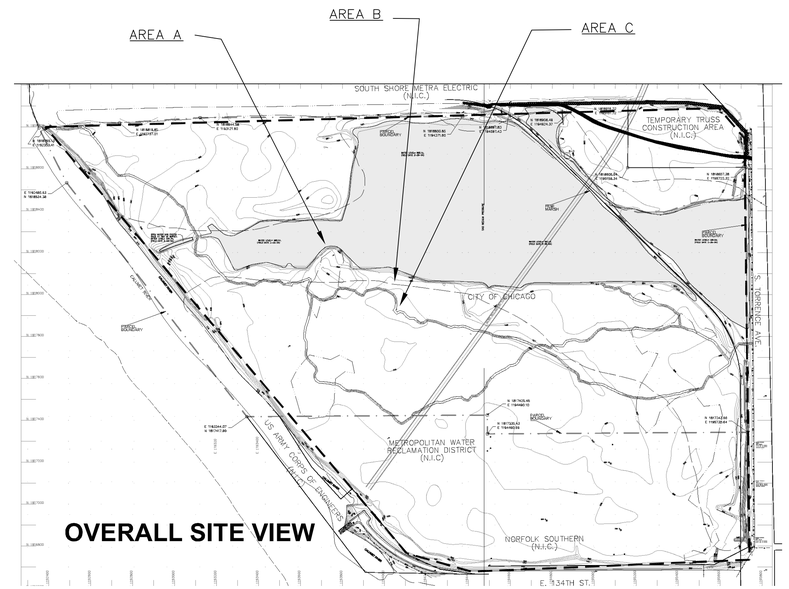


Figure 10 - Hegewisch Marsh Addendum Sample Locations



THERE IS A POTENTIAL "NO WORK" WINDOW FOR THE PROJECT BETWEEN APRIL 1 AND AUGUST 1. SURVEYS WILL BE CONDUCTED TO DETERMINE WHETHER THREATENED OR ENDANGERED (T&E) BIRDS ARE PRESENT AT THE SITE AND ARE DEMONSTRATING BREEDING ACTIVITY, (INCLUDING COURTSHIP DISPLAY, TERRITORIAL DISPLAY AND NESTING ACTIVITY). IF IT IS DETERMINED THAT BREEDING OR NESTING T&E SPECIES ARE PRESENT, THEN A MODIFIED CONSTRUCTION PROTOCOL WOULD BE IMPLEMENTED DURING THIS TIME PERIOD. THIS PROTOCOL WILL BE DEVELOPED WITH INPUT FROM FISHERIES AND WILDLIFE SERVICE AND/OR ILLINOIS DEPARTMENT OF NATURAL RESOURCES PERSONNEL. THE MODIFIED CONSTRUCTION PROTOCOL WOULD LIKELY REQUIRE THAT HEAVY MACHINERY, INCLUDING TRUCK TRAFFIC, NOT BE PERMITTED DURING THIS TIMEFRAME.

IF T&E BIRDS ARE NOT OBSERVED NESTING ON SITE WITHIN THIS TIME PERIOD, THEN WORK MAY CONTINUE. HOWEVER, THE CONTRACTOR SHALL TAKE MEASURES TO AVOID DISTURBING ALL NESTING BIRDS FROM APRIL 1 THROUGH AUGUST 1. IF A NEST OR DEFENSIVE BIRD IS ENCOUNTERED, OR IF A BIRD IS FLUSHED FROM A NEST, THE AREA SHOULD BE FLAGGED AND AVOIDED UNTIL AFTER AUGUST 1.

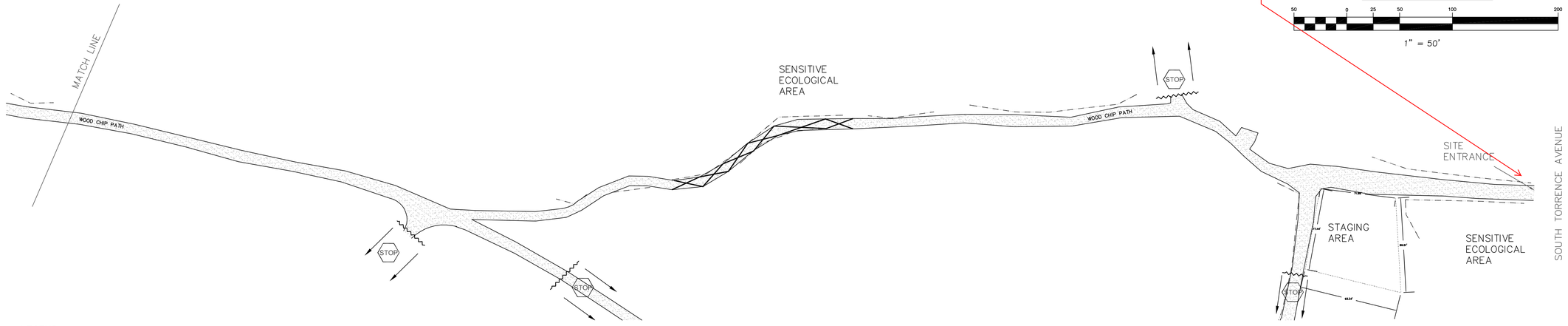


Site visit meeting location for Wednesday, February 1 at 1:00

GRAPHIC SCALE

50 0 25 50 100 200

1" = 50'



LEGEND

- REMEDIATION BOUNDARY
- EDGE OF WETLAND AREA
- STAGING AREA
- PLACE TRAFFIC BARRIER RESTRICTED PATHWAYS, NO ACCESS IN THE DIRECTION OF ARROWS
- TREES WITHIN REMEDIATION AREAS
- IP IRON PIPE
- EXISTING WOOD CHIP PATHWAY TO BE CONVERTED WITHIN WORK LIMITS TO TEMPORARY HAUL ROAD DURING CONSTRUCTION AS PER DETAIL 1 AND RESTORED PER DETAIL 2 ON SHEET CO.06.
- POTENTIAL LOCATION OF TEMPORARY REUSABLE MATS

NOTES:

1. EXISTING WOOD CHIP PATH WITHIN THE WORK LIMITS TO BE USED AS AN AGGREGATE HAUL ROAD AND THEN RESTORED UPON COMPLETION.
2. WORK AREA RESTRICTED TO REMEDIATION AREAS, DESIGNATED STAGING AREA, TEMPORARY ACCESS ROADS, AND TEMPORARY HAUL ROAD. ALL OTHER AREAS ARE CONSIDERED SENSITIVE ECOLOGICAL AREAS.
3. IF AGGREGATE MATERIAL DOES NOT PROVIDE SUFFICIENT BEARING CAPACITY FOR THE SITE VEHICLES DURING WET CONDITIONS, INSTALL TEMPORARY, PORTABLE AND REUSABLE MATS MADE OF COMPOSITE FIBERGLASS, HIGH DENSITY POLYETHYLENE, RUBBER OR OTHER APPROVED MATERIAL.
4. WIDTH OF THE TEMPORARY HAUL ROAD IS LIMITED TO 9 FEET.
5. TREES ARE PRESENT IN THE STAGING AREA THAT MAY NEED TO BE REMOVED.
6. CONTRACTOR WILL NEED TO COORDINATE WITH CDOT REGARDING SITE SECURITY THE LANE CLOSURES AND TRAFFIC RESTRICTIONS ASSOCIATED WITH THE 130TH AND TORRENCE AVENUE RECONSTRUCTION PROJECT. THE SITE ENTRANCE IS SECURED WITH A LOCKED GATE (ACCESSED BY CDOT) CONTRACTOR WILL COORDINATE WITH CDOT TO ENSURE GATE IS LOCKED AT THE END OF EACH WORKING DAY AND THE SITE SECURED

ISSUED FOR BID

Figure 11 - Hegewisch Marsh Remediation Areas

FOR REFERENCE ONLY

REVISIONS

NUMBER	BY	DATE
-	-	-

CITY OF CHICAGO INCORPORATED 4th MARCH 1837

Chicago Department of Environment

SITE ACCESS PLAN

HEGEWISCH MARSH SOIL REMEDIATION PROJECT CHICAGO, IL

GSG CONSULTANTS, INC.
855 W. ADAMS, SUITE 200
CHICAGO, IL 60607
PHONE: (312) 733-6262
FAX : (312) 733-5612

DRAWN BY: JD/LO

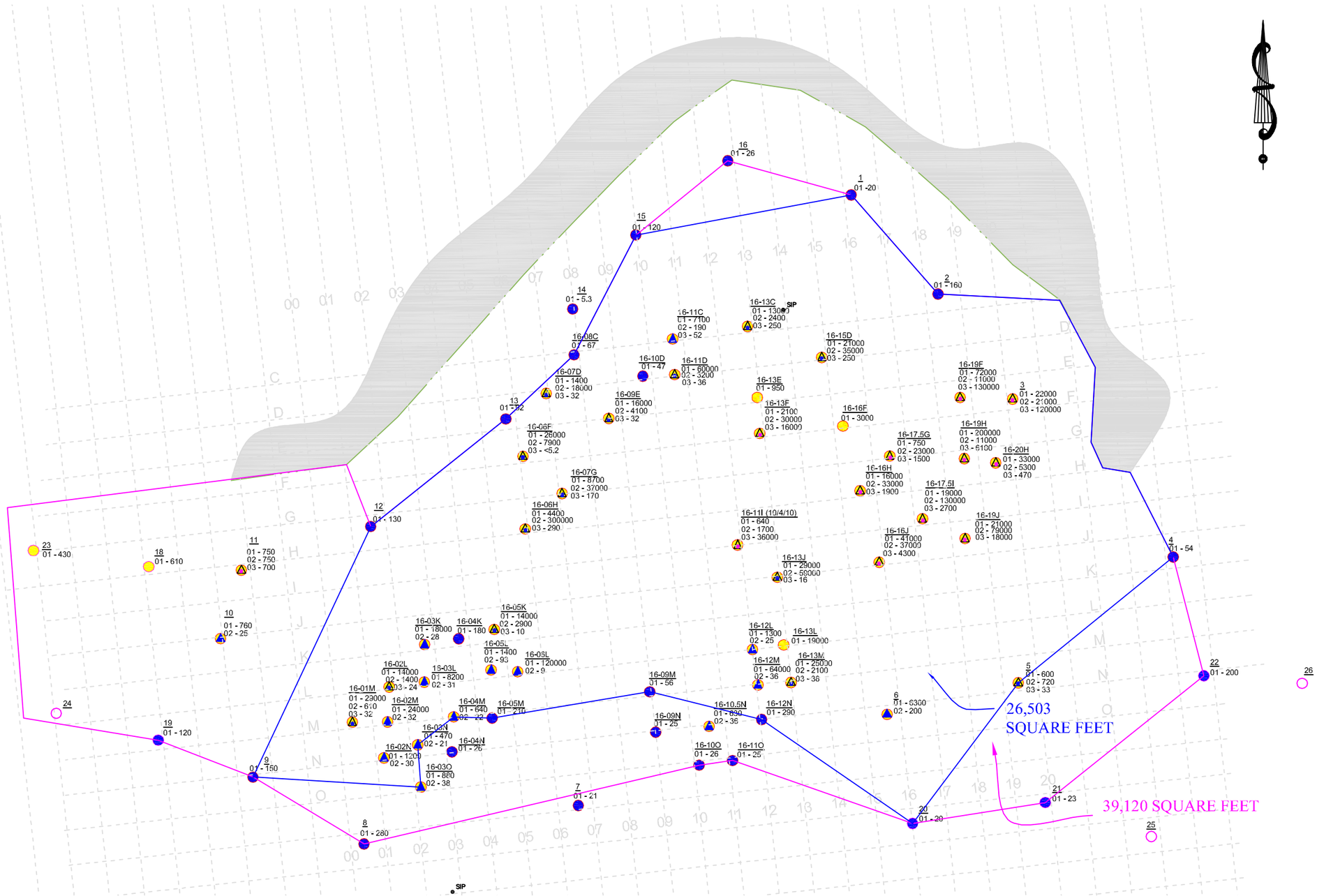
CHECKED BY: SL

SCALE: 1" = 50'

DATE; 09/28/11

PROJECT NO: -

SHEET: A0.01



LEGEND

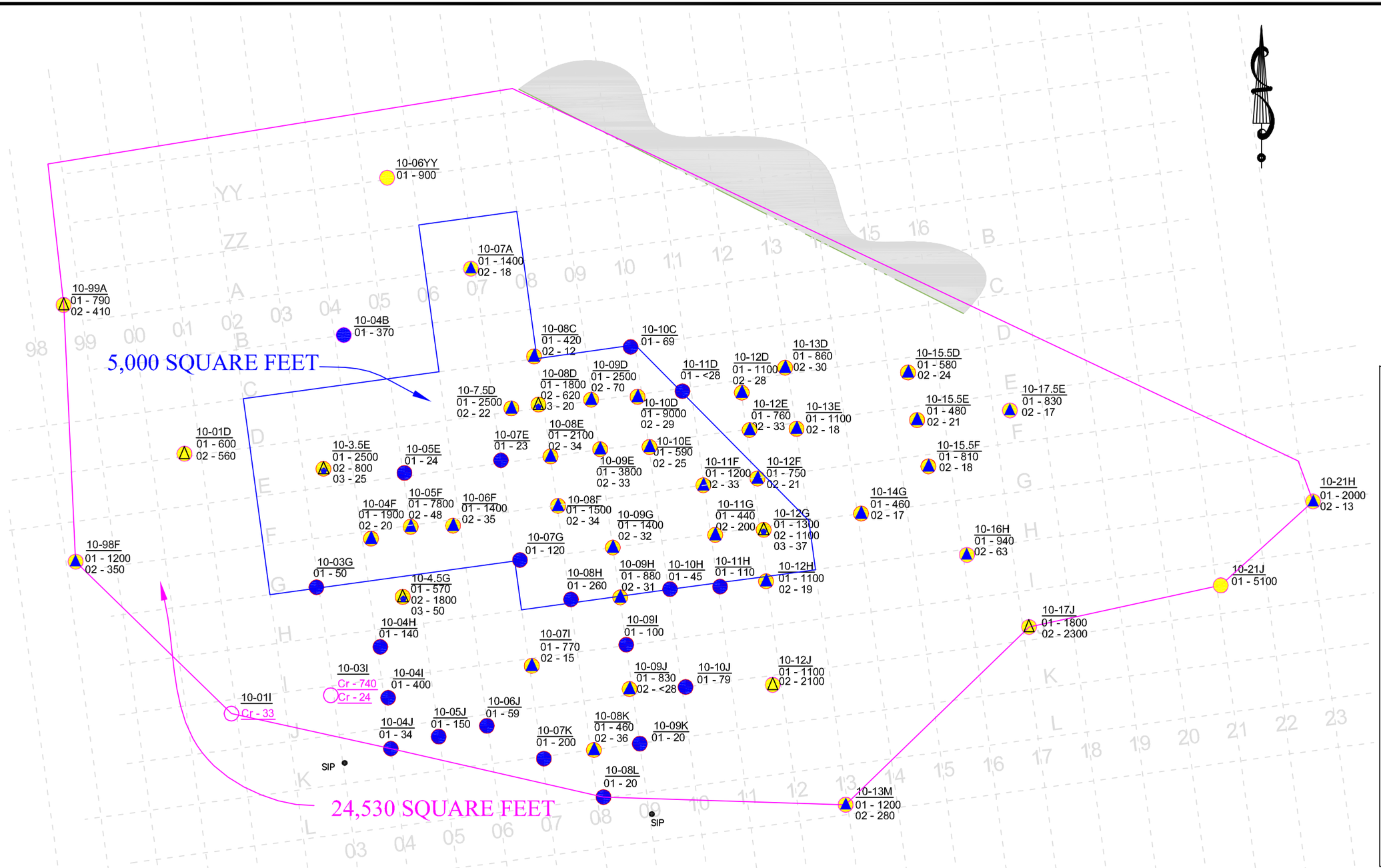
- Boring location with total lead in mg/kg
  - -01 6"-12"
  - -02 12"-24"
  - -03 24"-36"
- 6"-12" Total Lead >400
- 6"-12" Total Lead ≤400
- March 2011 Borings
- 12"-24" Total Lead >400
- 12"-24" Total Lead ≤400
- 24"-36" Total Lead >400
- 24"-36" Total Lead ≤400
- Extent based on Tier 1 objective (Lead = 400 mg/kg)
- Extent based on Tier 3 objective (Lead = 1,169 mg/kg)
- Shoreline

GSG CONSULTANTS, INC.
855 W. ADAMS, SUITE 200
CHICAGO, IL. 60607
PHONE: (312) 733-6262
FAX : (312) 733-5612

SCALE: NTS	DRAWN BY: LO
	CHECKED BY: SL
	DATE: 5/5/11

AREA 16 TIER 1 AND TIER 3 REMEDIATION AREAS
HEGEWISCH MARSH

Figure 12 - Remediation Area A Limits

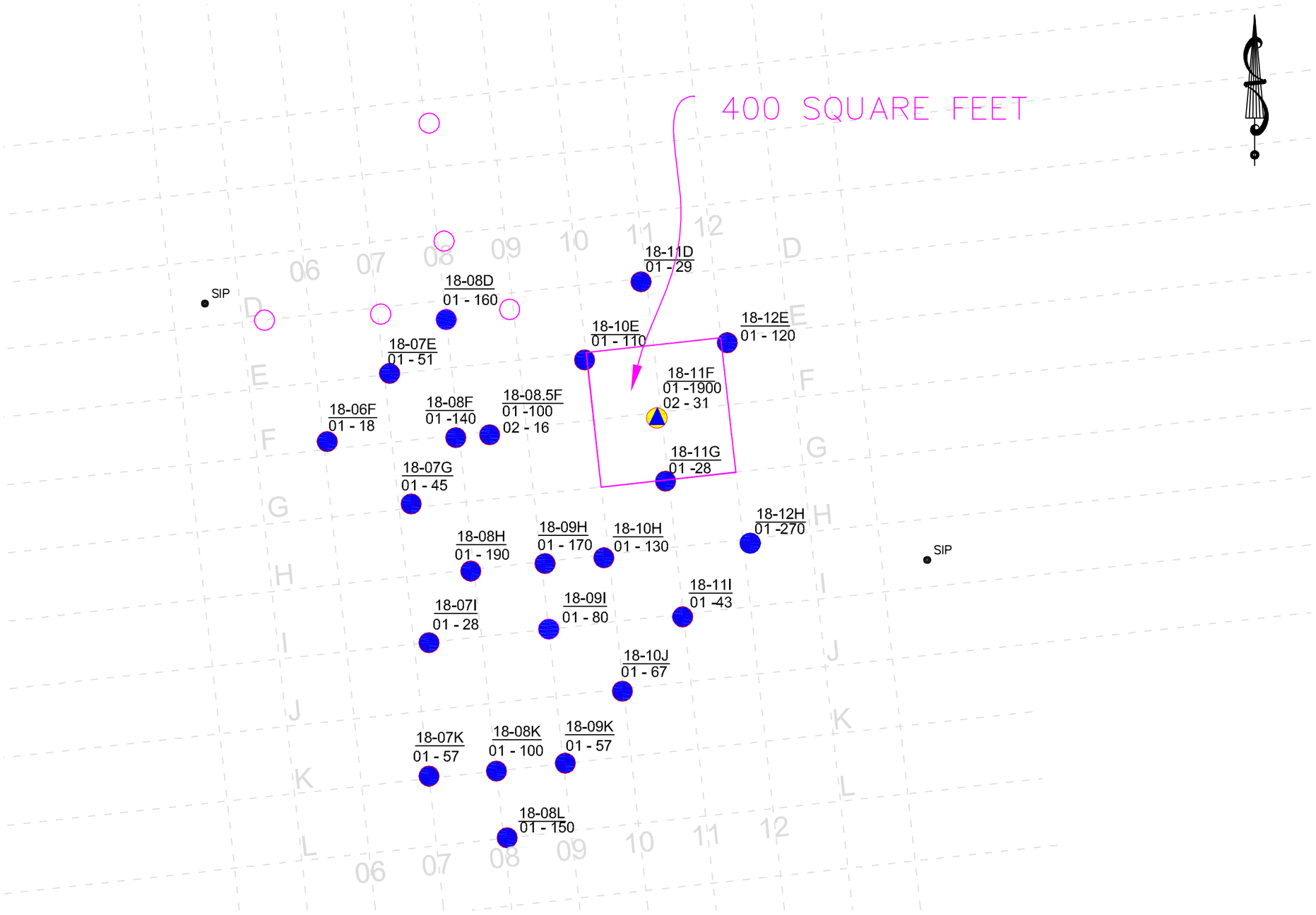


GSG CONSULTANTS, INC.
855 W. ADAMS, SUITE 200
CHICAGO, IL. 60607
PHONE: (312) 733-6262
FAX : (312) 733-5612

SCALE: NTS	DRAWN BY: LO
	CHECKED BY: SL
	DATE: 5/5/11

AREA 10 TIER 1 AND TIER 2 REMEDIATION AREAS
HEGEWISCH MARSH

Figure 13 - Remediation Area B Limits



LEGEND

- Boring location with total lead in mg/kg
  -01 6"-12"
  -02 12"-24"
  -03 24"-36"
- March 2011 Borings
- 6"-12" Total Lead >400
- 6"-12" Total Lead ≤400
- 12"-24" Total Lead ≤400
- Extent based on Tier 1 objective (Lead = 400 mg/kg)

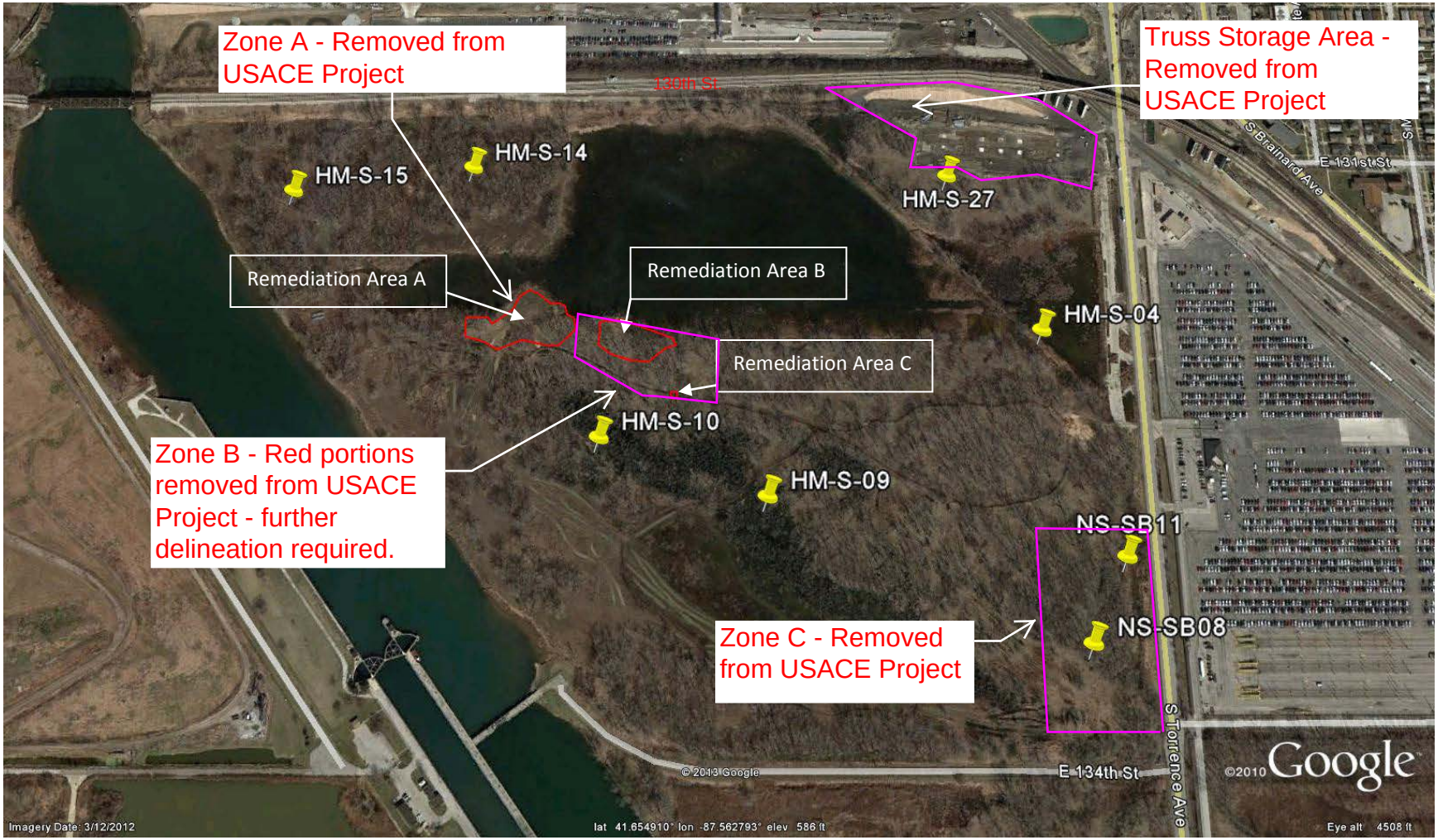
GSG CONSULTANTS, INC.
855 W. ADAMS, SUITE 200
CHICAGO, IL. 60607
PHONE: (312) 733-6262
FAX : (312) 733-5612

SCALE: NTS	DRAWN BY: LO
	CHECKED BY: SL
	DATE: 5/5/11

AREA 18 TIER 1 REMEDIATION AREA
HEGEWISCH MARSH

Figure 14- Remediation Area C Limits

Figure 15 - Conceptual Site Model



Zone A - Remediation Area A

existing and proposed ground surface

0-2 feet bgs, clean fill, plastic barrier between clean and RCRA material

2-5 feet bgs, RCRA lead material

5-15 feet bgs, additional fill (unknown quality)

Zone B - Rem. Areas B & C

existing and proposed ground surface

0-1 feet bgs, clean fill (remediated)

1+ feet bgs, low level soil contamination. COCs: below Tier 3 Site specific remediation objectives. Horizontal delineation unclear, buffer will be established in design (B). C - potential RCRA lead material.

Zone C - Removed from Project

existing ground surface

0-3 feet bgs, soils exceed Tier 3 human health risk remediation objective for lead

3+ feet bgs, low level soil contaminants.

Zone D - Remaining Site

existing and proposed ground surface

0+ feet bgs, low level soil and sediment contaminants. Ecological risk assessment conducted (bioavailability and toxicity studies) suggest restoring habitat can be conducted without imposing ecological risk.